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 August 2020

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, cannabinol 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 sensemilla (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'.

1988 Hamadeh et al looked at fatal aspergillosis associated with smoking contaminated marijuana in a bone-marrow recipient. 'A 34-year-old man presented with pulmonary aspergillosis on the 75th day after marrow transplant for chronic myelogenous leukemia. The patient had smoked marijuana heavily for several weeks prior to admission. Cultures of the marijuana revealed Aspergillus fumigatus with morphology and growth characteristics identical to the organism grown from open lung biopsy specimen. Despite aggressive antifungal therapy, the patient died with disseminated disease. Physicians should be aware of this potentially lethal complication of marijuana use in compromised hosts'.

2000 Congenital Anomaly Register & Information Service found that the incidence of gastrochisis doubled from 0.67 in 1987 to 1.35 per 10,000 of total births in 1991. Known risk factors include younger mothers, first babies, socially disadvantaged groups, mothers who smoke or use illegal drugs. Wales (40 cases in 1998) had a more significantly higher rate than England and Wales (103 in 1998) as a whole. Marijuana and cannabis/amphetamines are mentioned.

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.

2007 Forrester et al Documented the risk of selected birth defects with prenatl illicit drug use in Hawaii from 1986 t0 2002. 'The objective of this study was to determine the risk of a variety of birth defects with prenatal illicit drug use. Data were derived from an active, population based adverse pregnancy outcome registry. Cases were all infants and fetuses with any of 54 selected birth defects delivered during 1986–2002. The prenatal methamphetamine, cocaine, or marijuana use rates were calculated for each birth defect and compared to the prenatal use rates among all deliveries. Among all deliveries, the prenatal use rate was 0.26% for marijuana.. Marijuana rates were significantly higher than expected for 21 (39%) of the birth defects. Increased risk for the three drugs occurred predominantly among birth defects associated with the central nervous system, cardiovascular system, oral clefts, and limbs. There was also increased risk of marijuana use among a variety of birth defects associated with the gastrointestinal system. Prenatal uses of methamphetamine, cocaine, and marijuana are all associated with increased risk of a variety of birth defects.

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 (Nederhasi) 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 lees than 0.1%.

2008 Moir et al compareed mainsteam and sidestream marijuana and tobacco cigarette smoke.
The chemical composition of tobacco smoke has been extensively examined, and the presence of known and suspected carcinogens in such smoke has contributed to the link between tobacco smoking and adverse health effects. The consumption of marijuana through smoking remains a reality and, among youth, seems to be increasing. There have been only limited examinations of marijuana smoke, including for cannabinoid content and for tar generation. There have not been extensive studies of the chemistry of marijuana smoke, especially in direct comparison to tobacco smoke. In this study, a systematic comparison of the smoke composition of both mainstream and sidestream smoke from marijuana and tobacco cigarettes prepared in the same way and consumed under two sets of smoking conditions, was undertaken. This study examined the suite of chemicals routinely analyzed in tobacco smoke. As expected, the results showed qualitative similarities with some quantitative differences. In this study, ammonia was found in mainstream marijuana smoke at levels up to 20-fold greater than that found in tobacco. Hydrogen cyanide, NO, NO x , and some aromatic amines were found in marijuana smoke at concentrations 3-5 times those found in tobacco smoke. Mainstream marijuana smoke contained selected polycyclic aromatic hydrocarbons (PAHs) at concentrations lower than those found in mainstream tobacco smoke, while the reverse was the case for sidestream smoke, with PAHs present

at higher concentrations in marijuana smoke. The confirmation of the presence, in both mainstream and sidestream smoke of marijuana cigarettes, of known carcinogens and other chemicals implicated in respiratory diseases is important information for public health and communication of the risk related to exposure to such materials.

2010 Another potency 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 asssociated with marijuana. Black mould, Stachybotrys, exists on almost all building materials. The growth of cannabis indoors poses a great problem as it provids ideal conditions. Also the 3 most dangerous strains of Aspergillus, fumigitus, flavus and niger exist naturally on the plant. A deadly afla-toxin could be the result. A 1996 treatment study by Withenshawe Hospital, Manchester, on 10,000 patients with invasisve Aspergillosis has shown $633m in costs, average $63,300/patient to treat not cure the disease.

2010 Spano et al looked at cannabinoid-opioid interactions in drug discrimination and self-administration: effect of maternal, postnatal, adolescent and adult exposure to the drugs. **Abstract:** Cannabinoids and opioids are known to strictly interact in many physiological and pathological functions, including addiction. The endogenous opioid system is significantly influenced by maternal or perinatal cannabinoid exposure, major changes concerning operant behaviour in adult animals. Copious data suggests that adolescence is also a particularly sensitive period of life not only for the initiation of abusing illicit drugs, but also for the effects that these drugs exert on the neural circuitries leading to drug dependence. This paper examines the role played by the age of drug exposure in the susceptibility to discriminative and reinforcing effects of both cannabinoids and opioids. We first revisited evidence of alterations in the density and functionality of mu-opioid and CB1 cannabinoid receptors in reward-related brain regions caused by either maternal, postnatal, adolescent or adult exposure to opioids and cannabinoids.Then, we reviewed behavioural evidence of the long-term consequences of exposure to opioids and cannabinoids during gestation,postnatal period, adolescence or adulthood, focusing mostly on drug discrimination and self-administration studies. Overall, evidenceconfirms a neurobiological convergence of the cannabinoid and opioid systems that is manifest at both receptor and behavioural levels.Although discrepant results have been reported, some data support the gateway hypothesis that adolescent cannabis exposure contributes to greater opioid intake in adulthood. However, it should be kept into consideration that in humans genetic, environmental, and social factors could influence the direct neurobiological effects of early cannabis exposure to the progression to adult drug abuse.

In 2010, Arendt et al published mortality figures among 20,581drug 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.

Δ^9-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 coffee-shops 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 coffee-shops. 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 post- natal 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.

2013 Public Health Agency of Canada published 'Congenital Abnormalities in Canada 2013. Findings included evidence of congenital heart defects and an ODDS Ratio for gastroschisis of 3.0

2013 Morgan et al looked at cerebrospinalfluid anandamide levels, cannabis use and psychotic-like symptoms. Abstract: Anandamide is a ligand of the endocannabinoid system. Animals show a depletion following repeated Δ(9)-tetrahydrocannabinol (THC) administration but the effect of cannabis use on central nervous system levels of endocannabinoids has not been previously examined in humans. Cerebrospinal fluid (CSF) levels of the endocannabinoids anandamide, 2-arachidonoylglycerol (2-AG) and related lipids were tested in 33 volunteers (20 cannabis users). Lower levels of CSF anandamide and higher levels of 2-AG in serum were observed in frequent compared with infrequent cannabis users. Levels of CSF anandamide were negatively correlated with persisting psychotic symptoms when drug-free. Higher levels of anandamide are associated with a lower risk of psychotic symptoms following cannabis use.

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.

2 014 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, 2 014 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 (amino-methyl-phosphonic 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 2011were included. They found that the rate 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.

29015 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 Ocampo and Rans wrote a paper on cannabis allergy. Conclusions Although still relatively uncommon, allergic disease associated with *C sativa* exposure and use has been reported with increased frequency. Allergic reactions and even anaphylaxis attributed to *C sativa* have been noted with sensitization associated with pollinosis, *Cannabis* use, potential plant cross-reactivity, and occupational exposure. With state laws allowing medical and in some cases recreational use of marijuana, there is a growing potential for legitimate personal and commercial exposure. The evolving legal status of *C sativa*, its highly prevalent use throughout the world, and the varied forms in which it is used could translate into its growing role as a clinically relevant allergen that might be encountered. Crude extracts have been used in different in vivo and in vitro testing methods to demonstrate the immunologic nature of these cases. However, the lack of standardized extracts limits validation and widespread applicability of such diagnostic testing. Much research is still needed to more definitively define pertinent allergens, develop a standardized extract, establish diagnostic sensitivity and specificity, and clarify treatment options for clinically affected *Cannabis*-allergic patients.

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 motoer 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 liberization 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 postliberization 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 8^{th}, 10^{th} and 12^{th} 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 8^{th}, 10^{th} and 12^{th} grade students. In 2012 and afterwards, as compared to their peers in other states, California 12^{th} 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% morelikely 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 assisance 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. 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 marijuanaor 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 Krauss 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%0 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 Daniulaityte 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 recereational 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 2million 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 100 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 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 cmbined 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 prevanence 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 eigth 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%. Medicinal 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.

2015 Ocampo and Rans wrote a paper on cannabis allergy. Conclusions Although still relatively uncommon, allergic disease associated with *C sativa* exposure and use has been reported with increased frequency. Allergic reactions and even anaphylaxis attributed to *C sativa* have been noted with sensitization associated with pollinosis, *Cannabis* use, potential plant cross-reactivity, and occupational exposure. With state laws allowing medical and in some cases recreational use of

marijuana, there is a growing potential for legitimate personal and commercial exposure. The evolving legal status of *C sativa*, its highly prevalent use throughout the world, and the varied forms in which it is used could translate into its growing role as a clinically relevant allergen that might be encountered. Crude extracts have been used in different in vivo and in vitro testing methods to demonstrate the immunologic nature of these cases. However, the lack of standardized extracts limits validation and widespread applicability of such diagnostic testing. Much research is still needed to more definitively define pertinent allergens, develop a standardized extract, establish diagnostic sensitivity and specificity, and clarify treatment options for clinically affected *Cannabis*-allergic patients.

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, cannabinol 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 Patsenker et al reviewed cannabinoids in liver disease. ' Mounting evidence indicates that the ECS (Endocannabinoid System) plays an important role in various liver diseases including viral hepatitis, non-alcoholic fatty liver disease, alcoholic liver disease, hepatic encephalopathy, and auto-immune hepatitis. The ECS also impacts on involved processes such as hepatitis hemodynamics, nutrient intake and turnover, and ischemia reperfusion (VR) after liver transplantation. Although this involvement is undisputed, therapeutic implications regarding the ECS are just beginning to emerge; so far, no approved drug acting specifically on the ECS is available'.

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 increasedby 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 1-5years 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.

2016 Ramaekers et al looked at Cannabis and tolerance and acute drug impairment as a function of cannabis use history. 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 most 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 lss 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, 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. 596 500 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 t0 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.

2016 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 hypoperfusion 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.

2016 Kosterman et al investigated parents' attitudes about marijuana use. Washington state in 2014 legalised marijuana for adults. Data from 395 participants recruited in a 30-year longitudinal study at age 10 in 1985 were analysed. Now parents they still live in the Washington area in 2014, they were asked to assess their perceptions of adolescent marijuana use.

'82% agreed that regular marijuana use is harmful to teens.
89% of respondents disapproved of marijuana use where children can see it.
93% disapproved of parental use while caring for children.
19% said they would allow high-school age children to decide whether or not to use marijuana , compared to 6%, answering the same question in 1991'.

2016 Kim et Monte looked at cananbis legalisation and its effect on emergency care. Not surprisingly, increased marijuana use after legalization has been accompanied by an increase in the number of ED visits and hospitalizations related to acute marijuana intoxication. Retrospective data from the Colorado Hospital Association, a consortium of more than 100 hospitals in the state, has shown that the prevalence of hospitalizations for marijuana exposure in patients aged 9 years and older doubled after the legalization of medical marijuana (15 per 100,000 hospitalizations in 2001 to 2009 versus 28 per 100,000 hospitalizations from 2010 to 2013; and that ED visits nearly doubled after the legalization of recreational marijuana (22 per 100,00 ED visits in 2010 to 2013 versus 38 per 100,000 ED visits from January to June of 2014.although these findings may be limited because of stigma surrounding disclosure of marijuana use in the prelegalization era. However, this same trend is reflected in the number of civilian calls to the Colorado poison control center. In the years after both medical and recreational marijuana legalization, the call volume for marijuana exposure doubled compared with that

during the year before legalization (medical marijuana legalization: 44 calls in 2010 versus 95 calls in 2011, recreational marijuana legalization: 127 calls in 2013 versus 221 calls in 2014'.

2016 ElSohly et al looked at potency changes in cannabis over two decades. Marijuana is the most widely used illicit drug in the United States and all over the world. Reports indicate that the potency of cannabis preparation has been increasing. This report examines the concentration of cannabinoids in illicit cannabis products seized by DEA (drug and enforcement administration) over the last two decades, with particular emphasis on Δ9-THC and cannabidiol (CBD). Samples in this report are received over time from DEA confiscated materials and processed for analysis using a validated 'gas chromatograph with flame ionization detector (GC/FID)' method.A total of 38,681samples of cannabis preparations were received and analyzed between January 1, 1995 and December 31, 2014. The data showed that, while the number of marijuana samples seized over the last four years has declined, the number of sinsemilla samples has increased. Overall, the potency of illicit cannabis plant material has consistently risen over time since 1995 from approximately 4% in 1995 to approximately 12% in 2014. On the other hand, the CBD content has fallen on average from approximately 0.28% in 2001 to <0.15% in 2014, resulting in a change in the ratio of THC to CBD from 14 times in 1995 to approximately 80 times in 2014. It is concluded that there is a shift in the production of illicit cannabis plant material from regular marijuana to sinsemilla. This increase in potency poses higher risk of cannabis use, particularly among adolescents.

2016 Bloomfield et al looked at the effects of THC on the dopamine system.

2017 Perucca looked at cannabinoids in the treatment of ecstasy, The interest in cannabis-based products for the treatment of refractory epilepsy has skyrocketed in recent years. Marijuana and other cannabis products with high content in Δ(9) - tetrahydrocannabinol (THC), utilized primarily for recreational purposes, are generally unsuitable for this indication, primarily because THC is associated with many undesired effects. Compared with THC, cannabidiol (CBD) shows a better defined anticonvulsant profile in animal models and is largely devoid of adverse psychoactive effects and abuse liability. Over the years, this has led to an increasing use of CBD-enriched extracts in seizure disorders, particularly in children. Although improvement in seizure control and other benefits on sleep and behavior have been often reported, interpretation of the data is made difficult by the uncontrolled nature of these observations. Evidence concerning the potential anti-seizure efficacy of cannabinoids reached a turning point in the last 12 months, with the completion of three high-quality placebo-controlled adjunctive-therapy trials of a purified CBD product in patients with Dravet syndrome and Lennox-Gastaut syndrome. In these studies, CBD was found to be superior to placebo in reducing the frequency of convulsive (tonic-clonic, tonic, clonic, and atonic) seizures in patients with Dravet syndrome, and the frequency of drop seizures in patients with Lennox-Gastaut syndrome. For the first time, there is now class 1 evidence that adjunctive use of CBD improves seizure control in patients with specific epilepsy syndromes. Based on currently available information, however, it is unclear whether the improved seizure control described in these trials was related to a direct action of CBD, or was mediated by drug interactions with concomitant medications, particularly a marked increased in plasma levels of N-desmethylclobazam, the active metabolite of clobazam. Clarification of the relative contribution of CBD to improved seizure outcome requires re-assessment of trial data for the subgroup of patients not comedicated with clobazam, or the conduction of further studies controlling for the confounding effect of this interaction.

2016 Benedict et al investigated fungal infections in a commercially insured population of the US
2016 Case reports have identified invasive fungal diseasesin persons who use cannabis and fungal contamination of cannabis has been described. In a large health insurance claims data base, persons who used cannabis were 3.5 (95% CI 2.6- 4.8) times more likely than persons who did not use cannabisto have a fungal infection in 2012 Cannabis can contain fungal pathogens that cause serious and often fatal infections in persons with immunocompromising conditions, such as cancer, transplant, or infection with HIV (*1*). In these patients, some reasons for using cannabis include pain and nausea relief and appetite stimulation. The frequency of fungal infections associated with cannabis is unknown but is a growing concern as more states legalize its medicinal and recreational use. We used health insurance claims data from 2016 to evaluate the prevalence of fungal infection In this large commercially insured population in the United States, cannabis use was associated with a higher prevalence of certain fungal infections. Although these infections were uncommon, they can result in substantial illness and even death, particularly in immunocompromised persons.diagnosis codes among persons who use cannabis and persons who do not use cannabis and to compare demographic and

clinical features between these 2 groups. Conclusion: In this large commercially insured population in the United States, cannabis use was associated with a higher prevalence of certain fungal infections. Although these infections were uncommon, they can result in substantial illness and even death, particularly in immunocompromised persons.

2017 Thompson et al investigated medical marijuana for contaminants, moulds and bacteria. 20samples were purchased from North Carolina dispensaries and examined for the presence of micro-organisms. A wealth of diverse bacteria and fungi were discovered known to cause serious infections, especially in immuno-compromised patients, Aspergillus, Cryptococcus, Mucor, E. Coli, etc. Patients undergoing transplants or cancer therapies, uncontrolled diabetes, AIDS, or any condition involving a weakened or suppressed immune system are especially vulnerable. Dr Joseph Custano, a cancer specialist and professor in Hematology and Oncology at UC Davis said, 'Infections with the pathogens we found in medical marijuana could lead to serious illness and even death. Inhaling marijuana in any form provides a direct portal of entry deep into the lungs where infection can easily take hold'.

2017Laporte et al looked at a brief intervention to reduce consumption in young cannabis users (15-25). In France, 77 general practitioners took part and 261 users were interviewed. After 1 year, there was no significant difference between the intervention and control groups in the median number of joints smoked per month among all users, but there was a difference in favor of the intervention among non-daily users . After 6 months, the intervention was associated with a more favorable change from baseline in the number of joints smoked (−33.3% vs 0%) and, among users younger than age of 18, smoking of fewer joints per month (12.5 vs 20).

2017 Milicic et al investigated the associations between E-cigarettes and binge drinking, marijuana use and energy drinks mixed with alcohol. Data from 39837 Canadian grade 9 to 12 students was used. 'Overall, 9.75% of respondents were current e-cigarette users. Current cigarette smokers (odds ratio [OR] = 3.009), current marijuana users (OR = 5.549), and noncurrent marijuana users (OR = 3.653) were more likely to report using e-cigarettes than non-cigarette smokers and non-marijuana users. Gender differences among males and females showed higher risk of e-cigarette use among female current marijuana users (OR = 7.029) relative to males (OR = 4.931) and female current smokers (OR = 3.284) compared to males (OR = 2.862). Compared to nonbinge drinkers, weekly (OR = 3.253), monthly (OR = 3.113), and occasional (OR = 2.333) binge drinkers were more likely to use e-cigarettes. Similarly, students who consume energy drinks mixed with alcohol (OR = 1.650) were more likely to use e-cigarettes compared to students who do not consume them'. 'Youth who binge drink or use marijuana have a greater increased risk for using e-cigarettes compared to cigarette smokers. These data suggest that efforts to prevent e-cigarette use should not only be discussed in the domain of tobacco control'.

2017 Kristman-Valente et al looked at the relationship between marijuana and conventional cigarette smoking behaviour from early adolescence to adulthood. 'Marijuana use and conventional cigarette smoking were associated within time in decreasing magnitude and increased cigarette smoking predicted increased marijuana use during adolescence. A reciprocal relationship was found in the transition from young adulthood to adulthood, such that increased conventional cigarette smoking at age 24 years uniquely predicted increased marijuana use at age 27 years, and increased marijuana use at age 24 years uniquely predicted more frequent conventional cigarette smoking at age 27 years, even after accounting for other factors'.

2017 Blundell et al Warned of the 'dark cloud of recreational drugs and vaping'. 'Electronic cigarettes are increasing in popularity with 19% of UK smokers reporting to have used them. The ability to regulate the evaporation temperature in newer electronic nicotine delivery systems (ENDS) facilitates the potential for use of these devices to 'vape' cannabis. Vaping cannabis does have the potential to reduce tobacco use and combustible cannabis/tobacco-related disease, but with over one-third of UK adults reporting lifetime use of recreational drugs and increasing e-cigarette uptake in adolescent groups the misuse of these devices poses a serious potential public health risk'.

2017 Mills et al looked at child maltreatment and cannabis use in young adulthood. A birth cohort of 7223 mother and child pairs were studied. Of these, 3778of the young people participated at age 21. After confounder adjustment, substantiated child maltreatment was associated with any life-time cannabis use (OR) = 1.60, cannabis use prior to age 17 (OR = 2.47), daily cannabis use (OR = 2.68) and DSM-IV cannabis abuse/dependence (OR = 1.72). Externalizing behaviour and tobacco and

alcohol use at age 14 were associated significantly with almost all cannabis outcomes, with internalizing behaviour associated inverse).

2017 Miech et al found that college attendance was a risk factor for cannabis use. 'Data come from the Monitoring the Future study, which has followed longitudinal panels drawn from annual nationally representative, baseline samples of 12th-grade students starting with the class of 1976. We studied panel members aged 19 to 22 years who had never used marijuana by 12th grade between 1977 and 2015. *Results.* College as a risk factor for marijuana initiation has increased significantly since 2013. The increased probability of past-year marijuana use for those enrolled versus not enrolled in college was 51% in 2015, 41% in 2014, and 31% in 2013; it averaged 17% to 22% from 1977 to 2012 among youths who had never used marijuana by 12th grade. Conclusin: College has grown as a risk factor for marijuana initiation since 2013'.

2017 Campbell et al looked at socioeconomic status and adverse birth outcomes. A study in London Ontario found that women who used marijuana during pregnancy were almost 3 times as likely to have an infant with low birth weight. Amphetamine use, chronic hypertension and smoking were also identified as other top risk factors for low birth weights. Low birth weight can lead to respiratory problems and asthma, poor cognitive development and type 2 diabetes, hypertension and cardiovascular disease later in life. Socioeconomic factors had little effect on birth outcomes. A birth weight of less than 2500grams was classed as low weight. The rate for this study was 6.4%.

2017 Wang et al found that emergency visits related to marijuana use at Colorado hospital had quadrupled from 2005 to 2014. Care records for 13 t0 21 year olds showed that visits rose from 146 t0 639. Adolescents with symptoms of mental illness accounted for 66% of the 3,443 marijuana-related visits. Psychiatry consultations increased from 65 to 442.

2017 Association for Research in Vision and Opthalmology (ARVO) Paper found that prenatal exposure to marijuana may have lasting effects on vision. 'Pregnant mice were exposed daily throughout the entire pregnancy to either marijuana smoke (in doses that mimic human exposure) or to filtered air. After birth, the newborn mice were evaluated at three, six and 12 months of age. The retinas of mice whose mothers had been exposed pre-natally to marijuana were significantly thinner. The findings further suggested that the retinas thickness did not normalize as the mice aged. The retina is part of the central nervous system and little is known about the effects of maternal cannabis use on retinal development on the offspring and its potential postnatal consequences'.

2017 Gilbert et al looked at intravenous administration of cannabis and lethal anaphylaxis. 'A 33-year-old woman is reported who collapsed and died shortly after injecting herself with a cannabis solution prepared by pouring boiling water onto plant material. There were no significant findings at autopsy, except for a single recent venepuncture wound in the left cubital fossa. Toxicological examination of the blood revealed low levels of methylamphetamine and amphetamine with tetrahydrocannabinol (Δ9-THC) and 11-nor-9-carboxy-Δ9-THC, and no opiates. The syringe used by the decedent contained Δ9-THC. Serum tryptase levels were markedly elevated. This finding coupled with the sudden collapse after injecting an aqueous extract of cannabis indicated a likely anaphylactic or anaphylactoid reaction to the extract. Cannabis allergy may occur following handling, inhalation, swallowing or injecting Cannabis sativa plants or their products. The possibility of an allergic reaction should therefore be considered at autopsy in deaths where there has been recent contact with cannabis'.

2017 Polat et al looked at corneal changes in long-term cannabinoid users. 'The study enrolled 28 eyes of 28 patients diagnosed with cannabinoid use disorder. The cannabinoid group was selected among patients who had been using the substance for 3 days or more per week over the past 1 year. 32 eyes of 32 age- and sex-matched healthy individuals enrolled as control group in the study. Corneal endothelial cell density (CD), coefficient of variation (CV) and hexagonal cell ratio (HEX) values were analyzed by specular microscopy. RESULTS: The mean CD was 2900±211 cells/mm2 in the cannabinoid group and 3097±214 cells/mm2 in the control group. There was a significant decrease in cannabinoid group. No significant difference was present between the cannabinoid and the control groups in terms of mean CV value. There was not a significant difference between the cannabinoid and the control groups in terms of mean HEX value. A significant decrease in CD was found in cannabinoid users compared the control group'.

2017 Chan et al looked at attitudes and marijuana beliefs among Colorado medical students. 'Medical students (n = 624) at the University of Colorado School of Medicine between January and February 2014 were invited to participate. We received 236 responses (37%). Students indicated support for marijuana legalization (64%), and few believed that physicians should be penalized for recommending marijuana to patients (6%). Nearly all (97%) believed that further marijuana research should be conducted, and believed marijuana could play a role in the treatment of various medical conditions. Seventy-seven percent reported that they believed marijuana use had the potential for psychological harm, and 68% indicated concern for potential physical harm. Only a minority of students would recommend marijuana to a patient under current law (29%), or if it were legally available (45%). Acceptability of marijuana for treatment of approved conditions was not correlated with age or gender, but was positively correlated with living in Colorado prior to medical school and with prior marijuana use. They concluded that medical students support marijuana legal reform, medicinal uses of marijuana, and increased research, but have concerns regarding risks of marijuana use, and appear hesitant to recommend marijuana to patients'.

2017 Bull et al looked at the awareness, perception of risk and behaviours related to retail marijuana among a sample of Colorado youth. 'Youth marijuana use is a growing concern with increasingly permissive views towards marijuana use. Little is known about attitudes and beliefs toward marijuana use among youth in the context of legalization. This study describes youth attitudes and beliefs about health risks associated with marijuana use, social norms of peer use, conversations with parents about marijuana use, and knowledge of recreational marijuana laws, using a venue-day-time sampling approach with diverse Colorado youth (n = 241) post-legalization. We considered demographic (gender, racial/ethnic and geographic) differences in knowledge of laws and perceptions of risk. While many youth are knowledgeable about retail marijuana laws in Colorado, males were 2.12 times more likely to be familiar with laws compared to females. While 40 % of the sample perceived a moderate to high risk from weekly marijuana consumption and 57 % from daily consumption, fewer males perceived these risks. Over ¾ of the sample indicate they discuss marijuana with parents, but many fewer indicate discussing consequences and health effects of use with parents. Results suggest opportunities for parents and clinicians to influence youth attitudes and behaviors towards marijuana use. It may be worthwhile to target educational campaigns to different demographic groups, and to offer training and capacity building for parents to discuss marijuana with their teenaged children'.

2017 Claudet et al conducted a 10 year review of cannabis exposure in children under 3-years of age. Abstract: Pediatricians working in an emergency environment are confronted with children admitted to emergency departments for intoxication on a daily basis. We carried out a retrospective cohort study of children admitted to a pediatric emergency department due to unintentional cannabis exposure over a 10-year period from 2004 to 2014. Twenty-nine children under the age of 3 were admitted with a positive cannabis urine test. Eighty-seven percent of intoxications occurred at the family home. Resin was the main form of ingested cannabis (69%). The mean age was 16.5 ± 5.2 months, and mean weight was 11.1 ± 2.1 Kg. Sixty percent of admissions occurred between 2012 and 2014. More severe presentations, based on Poisoning Severity Score, occurred over the past 2 years. Four children experienced seizures before admission. Ten children (34%) had a decreased level of consciousness (GCS <12) and were admitted to a pediatric intensive care unit for 12-24 h. All of them had ingested hashish (resin). The majority (70%) of children suffering from neurological impairment were admitted in the last year, of whom three required assisted ventilation. There were no cases with major outcomes and no deaths. Parents were not assessed regarding their cannabis consumption.

CONCLUSION: This study supports the impression that accidental child poisonings with cannabis have been more serious than previously thought for 2 years. This observation may be explained by (1) the increased THC concentration in cannabis and (2) the widespread use in young adults, even after they become parents. Introducing an addiction team inside the PED could help to improve the care links with these parents. What is Known: • Cases of unintentional cannabis intoxication in children have been increasing for many years due to an increase of potency. What is New: • We highlight an increase in more severe presentations in children under the age of 3 occurring over the past 2 years, which will indicate the importance of assessing cannabis abuse in parents by a specialized addiction team.

2017 Popova et al looked at perceived harms and benefits of tobacco, marijuana and electronic vaporisers among young adults in Colorado**. Abstract:** Participants were thirty-two young adults (18-26 years old) who used tobacco/marijuana/vaporizers. Semi-structured interviews addressed perceived harms and benefits of various tobacco and marijuana products and personal experiences with these

products. FINDINGS: Young adults evaluated harms and benefits using five dimensions: (1) Combustion - smoking was considered more harmful than non-combustible products (e.g., e-cigarettes, vaporizers, and edibles); (2) Potency - edibles and marijuana concentrates were perceived as more harmful than smoking marijuana flower because of potential to receive too large a dose of THC (tetrahydrocannabinol); (3) Chemicals - products containing chemical additives were seen as more harmful than "pure" or "natural" plant products; (4) Addiction - participants recognized physiological addiction to nicotine, but primarily talked about psychological or lifestyle dependence on marijuana; (5) Source of knowledge - personal experiences, warning labels, campaigns, the media, and opinions of product retailers and medical practitioners affected perceptions of harms and benefits. Conclusion: Among young adults in Colorado, USA, perceived harms and benefits of tobacco and marijuana include multiple dimensions. Health educational campaigns could benefit from addressing these dimensions, such as the potency of nicotine and cannabis concentrates and harmful chemicals present in the organic material of tobacco and marijuana. Descriptors such as "natural" and "pure" in the promotion or packaging of tobacco and marijuana products might be misleading.

2017 Montanari et al reported on significantly growing numbers of people entering drug treatment in Europe for cannabis-related problems. The data from 22 countries from 2003 to 2014 were used. Overall increase of cannabis treatment entries is continuous although country-related differences are observed. Possible explanations include: increase in prevalenceand cannabis-related problems, changes in risk perception, increases in cannabis potency, changes in referral practice and increased availability and accessibility of treatment services.

2017 Shariff et al found that cannabis, used often was a risk for gum disease. Data came from 1938 US adults who participated in the Center for Disease Control's 2011-2012 National Health and Nutrition Examination Survey, 27% admitted using cannabis one or more times for at least 12 months. Healthy gums fit a tooth snugly (no more than 1- 3mm space, known as pocket depth, between tooth and surrounding gum tissue. Wider pockets usually indicate the presence of periodontitis. Frequent cannabis uses had more sites with pocket depths indicative of moderate to severe periodontal disease compared to less frequent users. After controlling for confounding factors, frequent recreational cannabis users are twice as likely as non-frequent users to have periodontal disease.

2017 Findings (Drug and Alcohol) – Young People's statistics from the Nat. Drug Treatment Monitoring System (NDTMS) 1s April 2015 to 31st March 2016. 'The diminishing youth treatment caseload in England is increasingly dominated by under-18s primarily being treated for cannabis use problems as the numbers of primary problem drinkers falls away to just 15% of the caseload. 87% of young people in specialist services say they have a problem with this drug.

2017 Windle et al studied social influences on college student use of tobacco products, alcohol and marijuana. '3,418 college students from seven universities in the state of Georgia participated in this study. For each tobacco product or substance, the highest associations were for friends' use. Similar to findings with adolescents, the use of alternative tobacco products, alcohol, and marijuana by parents, siblings, and friends is associated with higher levels of use among college students, and friends' use was the most potent correlate for this phase of the lifespan'.

2017 Kendler et al looked at drug-associated mortality across the lifespan. 'We examined all individuals born in Sweden 1955-1980 (n = 2,696,253), 75,061 of whom developed DA (Drug Abuse). The mortality hazard ratio (mHR) for DA was 11.36, substantially higher in non-medical (18.15), than medical causes (8.05), and stronger in women (12.13) than in men (11.14). Comorbid smoking and alcohol use disorder explained only a small proportion of the excess DA-associated mortality. Co-relative analyses demonstrated substantial familial confounding in the DA-mortality association with the strongest direct effects seen in middle and late-middle ages. The mHR was highest for opiate abusers (24.57), followed by sedatives (14.19), cocaine/stimulants (12.0), and cannabis (10.93)'.

2017 Friese et al explored the use of marijuana edibles by adolescents in California. Abstract: 'We analyzed California Healthy Kids Survey data collected in one Northern California school district with a racially and ethnically diverse student population. Survey respondents were youth in grades 9-12. Overall, 33% of respondents reported having used marijuana in their lifetime, and 50% of lifetime marijuana users reported using marijuana in the past 30 days. Seventy-two percent of lifetime marijuana users and 82% of past month marijuana users reported having used edibles in their lifetime. Comparing marijuana users who have never used edibles to those users who have, we found that edible users reported using marijuana more frequently in their lifetime. Edible users were also more likely to have used marijuana in the past 30 days, more frequently in the past 30 days, more likely on school property and more frequently on school property. Edible users and non-users differed in their

perceptions of risk; edible users were less likely to agree that edible use is very risky. Edible users also reported a younger age of first marijuana use and more attempts to stop using marijuana than non-edible users. Multi-level regression analyses indicate that prevalence of edible use among marijuana users was related to perceived risk of edible use. Perceived risk of edible use among marijuana users was higher among marijuana users who do not use edibles, females, and those youth who perceive school rules to be clear. The findings indicate that prevalence of edible use is high among marijuana users, especially frequent users.

2017 Gourdet et al examined how 4 US States regular recreational marijuana edibles. 'State laws governing recreational marijuana edibles have evolved since the first recreational edible products were available for sale. Alaska, Colorado, Oregon, and Washington now require edible product labels to disclose a variety of product information, including risk factors associated with consumption. However, there still remain concerns about the regulatory gaps that exist in each of these states, inherent difficulties in enforcing laws around the labelling, packaging, and manufacturing of edibles, and the outstanding question of whether these edible laws are actually informing consumers and keeping the public safe. Alaska, Colorado, Oregon, and Washington vary greatly in how they regulate labelling and packaging. Colorado, Oregon and Washington require a Universal Symbol to be affixed to edibles, but only Oregon and Washington require that the use of pesticides be disclosed on the label. Only Colorado and Oregon require that the packaging for edibles bear a Nutrition Facts Panel on the label. Δ9-Tetrahydracannabinol (THC) in a single serving or single edible product as Alaska and Oregon. All four states prohibit the manufacture or packaging of edibles that appeal to youth'.

2017 Paschall et al looked at medical marijuana use and legalisation in Oregon. Abstract: 'While the legalization of marijuana for medical and recreational use has raised concerns about potential influences on marijuana use and beliefs among youth, few empirical studies have addressed this issue. We examined the association between medical marijuana patients and licensed growers per 1000 population in 32 Oregon counties from 2006 to 2015, and marijuana use among youth over the same period. We obtained data on registered medical marijuana patients and licensed growers from the Oregon Medical Marijuana Program and we obtained data on youth marijuana use, perceived parental disapproval, and demographic characteristics from the Oregon Healthy Teens Survey. Across 32 Oregon counties, the mean rate of marijuana patients per 1000 population increased from 2.9 in 2006 to 18.3 in 2015, whereas the grower rate increased from 3.8 to 11.9. Results of multi-level analyses indicated significant positive associations between rates of marijuana patients and growers per 1000 population and the prevalence of past 30-day marijuana use, controlling for youth demographic characteristics. The marijuana patient and grower rates were also inversely associated with parental disapproval of marijuana use, which decreased from 2006 to 2015 and acted as a mediator. These findings suggest that a greater number of registered marijuana patients and growers per 1000 population in Oregon counties was associated with a higher prevalence of marijuana use among youth from 2006 to 2015, and that this relationship was partially attributable to perceived norms favorable towards marijuana use'.

2017 Corroon et al investigated the use of cannabis as a substitute for prescription drugs. 'A total of 2,774 individuals in Washington State were a self-selected convenience sample who reported having used cannabis at least once in the previous 90 days. Subjects were surveyed via an online anonymous questionnaire on cannabis substitution effects. A total of 1,248 (46%) respondents reported using cannabis as a substitute for prescription drugs. The most common classes of drugs substituted were narcotics/opioids (35.8%), anxiolytics/benzodiazepines (13.6%) and antidepressants (12.7%). A total of 2,473 substitutions were reported or approximately two drug substitutions per affirmative respondent. The odds of reporting substituting were 4.59, greater among medical cannabis users compared with non-medical users and 1.66 greater among those reporting use for managing the comorbidities of pain, anxiety and depression. A slightly higher percentage of those who reported substituting resided in states where medical cannabis was legal at the time of the survey (47% vs. 45%,), but this difference was not statistically significant'.

2017 Henry looked at early onset of drug use among fathers with alcohol and cannabis use disorders. 'The children of fathers who met the criteria for a lifetime cannabis use disorder were more likely to initiate use of alcohol (odds ratio = 6.71) and cannabis (odds ratio = 8.13) by age 15, when background covariates and presence of a lifetime alcohol use disorder were controlled for. No unique effect of fathers' alcohol use disorder on children's onset of alcohol and cannabis use was observed. Fathers' lifetime cannabis use disorder had a unique and robust association with children's uptake of alcohol and cannabis by age 15.

2017 Borodovsky et al found that legal cannabis laws impact teen use. Data from Facebook (2630 cannabis-using youths aged 14 – 18) was used to discover that adolescents living in medical marijuana states with a plethora of dispensaries are more likely to have tried new methods of cannabis use such as vaping and edibles. This happens at a younger age than those living in states with fewer dispensaries.

2017 Hasin et al investigated US adult illicit cannabis use, cannabis use disorder and medical marijuana laws. US National Survey data collected from 1991-2, 2001-2, 2012-3, from 118497 participants, the risk for cannabis use and cannabis use disorders increased at a significantly greater rate in states that passed medical marijuana laws than those who did not.

2017 Al-Shammari et al looked at the Effects of the 2009 Medical Cannabinoid Legalization Policy on Hospital Use for Cannabinoid Dependency and Persistent Vomiting. 'We observed an increasing trend of CDU or an aggregate of CDU and persistent vomiting during the pre-legalization period. The legalization of marijuana significantly increased the incidence rate during the legalization period (by 17.9%) and the yearly average increase in rate by 6% after policy implementation, compared to the pre-legalization period. The increase in rate of persistent vomiting after policy implementation increased significantly (by about 8%), although there were no significant trends in increase prior to or during marijuana legalization in 2009'.

2017 Patrick et al looked at High-intensity and simultaneous alcohol and marijuana use among high school seniors in the U.S. 'Data come from nationally representative samples of U.S. 12th graders who participated in the Monitoring the Future study from 2005 to 2014 (N = 24,203 respondents; 48.4% boys, 51.6% girls). Results: SAM use during the past year was reported by 20% of 12th graders overall. SAM use prevalence was strongly and positively associated with alcohol and marijuana use intensity even after controlling for covariates. High school seniors at highest risk for engaging in SAM use were those who reported 10+ drinks and those smoking at least 1 joint/day. Approximately 60% of those who had 10-14 or 15+ drinks in a row during the past two weeks and 76-80% of those who had 1 or 2+ joints per day on average during the past 30 days reported SAM use.Results suggest that high school seniors who consume high quantities of alcohol and marijuana are very likely to consume these substances so that their effects overlap'.

2017 O'Brien et al looked at post-high school changes in tobacco and cannabis use in The UnitedStates. Living in a dorm/fraternity/sorority was associated with an increased prevalence in cannabis use while attending a 4-year college was associated with a decreased prevalence in cigarette use.

2017 Tomassi et al studied the influence of childhood trauma on diagnosis and substance use in first-episode psychosis. They aimed **'**To test whether people with first-episode psychosis who had experienced childhood trauma, when compared with those who had not, showed a higher rate of affective psychosis and an increased lifetime rate of substance use. The sample comprised 345 participants with first-episode psychosis (58% male, mean age 29.8 years). Severe sexual abuse was significantly associated with a diagnosis of affective psychosis ($\chi 2 = 4.9$, $P = 0.04$) and with higher rates of lifetime use of cannabis (68% *v* 41%; $P = 0.02$) and heroin (20% *v* 5%; $P = 0.02$). Severe physical abuse was associated with increased lifetime use of heroin (15% *v* 5%; $P = 0.03$) and cocaine (32% *v* 17%; $P = 0.05$)'. They concluded that **'**Patients with first-episode psychosis exposed to childhood trauma appear to constitute a distinctive subgroup in terms of diagnosis and lifetime substance use'.

2017 Mason et al looked at the influence of close friends and substance abuse. 'Results implicate the importance of understanding problematic peer behavior within the context of close, adolescent friendships. Adolescents with close friends who were substance users, who made offers to use substances, and who engaged in risky behaviors were more likely to use tobacco and cannabis. Perceptions of young adolescents' close friends' behaviors influenced their substance use up to 2 years later. (PsycINFO Database Record'

2017 Casajuana et al investigated 'the standard joint unit'. '492 participants donated 315 valid joints. Donators were on average 29 years old, mostly men (77%), single (75%), with at least secondary studies (73%) and in active employment (63%). Marijuana joints (N=232) contained a median of 6.56mg of 9-THC (Interquartile range-IQR=10,22) and 0.02mg of CBD (IQR=0.02); hashish joints (N=83) a median of 7.94mg of 9-THC (IQR=10,61) and 3.24mg of CBD (IQR=3.21). Participants rolled 4 joints per gram of cannabis and paid 5€ per gram (median values). Consistent 9-THC-content in joints lead to a SJU of 7mg of 9-THC, the integer number closest to the median values shared by both cannabis types. Independently if marijuana or hashish, 1 SJU = 1 joint = 0.25 g of

cannabis = 7 mg of 9-THC. For CBD, only hashish SJU contained relevant levels. Similarly to the Standard Drink Unit for alcohol, the SJU is useful for clinical, epidemiological and research purposes.

2017 Ford et al produced an overview of cannabis, its adverse acute and chronic effects and their implications.

Abstract: 'In many communities, cannabis is perceived as a low-risk drug, leading to political lobbying to decriminalise its use. However, acute and chronic cannabis use has been shown to be harmful to several aspects of psychological and physical health, such as mood states, psychiatric outcomes, neurocognition, driving and general health. Furthermore, cannabis is highly addictive, and the adverse effects of withdrawal can lead to regular use. These in turn have adverse implications for public safety and health expenditure. Although the cannabinoid cannabidiol (CBD) has been shown to have positive health outcomes with its antioxidant, anticonvulsant, anti-inflammatory and neuroprotective properties, high-potency cannabis is particularly damaging due to its high tetrahydrocannabinol (THC), low CDB concentration. It is this high-potency substance that is readily available recreationally. While pharmaceutical initiatives continue to investigate the medical benefits of CDB, "medicinal cannabis" still contains damaging levels of THC. Altogether, we argue there is insufficient evidence to support the safety of cannabis and its subsequent legalisation for recreational use. Furthermore, its use for medicinal purposes should be done with care. We argue that the public conversation for the legalisation of cannabis must include scientific evidence for its adverse effects'.

2017 Lee et al Looked at the trajectories of cannabis use beginning in adolescence associated with symptoms of PTSD in the mid-thirties. 'Growth mixture modelling was conducted to identify the cannabis use trajectory groups using a community sample of 674 participants (53% African Americans, 47% Hispanics of Puerto Rican decent; 60% females) from the Harlem Longitudinal Development Study. Logistic regression analyses were performed to examine the association between earlier trajectories of cannabis use (ages 14 to 36) and later symptoms of PTSD (at age 36) for the full model including the entire sample (N = 674) as well as the reduced model including only participants who had experienced a traumatic event (n = 205). Five trajectory groups of cannabis use were obtained. The chronic use group (full model: adjusted odds ratio [AOR] = 4.68, reduced model: AOR = 4.27, the late quitting group (full model: AOR = 6.18, reduced model: AOR = 6.67, and the moderate use group (full model: AOR = 3.97, reduced model: AOR = 3.32) were all associated with an increased likelihood of having PTSD symptoms at age 36 compared with the no use group.The findings provide information that PTSD symptoms in the mid-30s can possibly be reduced by decreasing membership in the chronic cannabis use trajectory group, the late quitting trajectory group, and the moderate cannabis use trajectory group'.

2017 Choi et al investigated nonmedical versus medical marijuana use among 3 age groups of adults, 'Given that 29 U.S. states now have laws allowing medical marijuana use, this study examined mental and physical health correlates of medical versus non-medical marijuana use among three age groups of adults (18-29, 30-49, and 50+). Data came from the 2012-2013 National Epidemiologic Survey on Alcohol and Related Conditions (N = 36,309 respondents aged 18+). Of all respondents, 9.74% (N = 3,784) reported past-year marijuana use. Of all past-year marijuana users, 11.03% (n = 445) reported medical use. Medical marijuana use rates were higher among the 50-64 age group (17.95%) than younger adults, and 32.88% of medical users, compared to 25.25% of non-medical users, had past-year marijuana use disorder. The odds of medical marijuana use were higher among those with marijuana use disorder (OR = 1.87) and personality disorder (OR = 1.42), with no age group differences. However, older adults with alcohol use disorder and sleep problems and middle-age adults with arthritis had diminished odds of having used medical marijuana relative to young adults. Given the high rates of marijuana use disorder among medical users, physicians should exercise caution in recommending marijuana for medical purposes, especially for younger adults. More research is needed on medical marijuana's safety and efficacy for patients at risk of marijuana use disorder. (Am J Addict 2017;XX:1-10).

2017 Hernandez et al looked at hyperemesis. 'Cannabinoid hyperemesis syndrome (CHS) is a paradoxical side effect of cannabis use. Patients with CHS often present multiple times to the emergency department (ED) with cyclical nausea, vomiting, and abdominal pain, and are discharged with various misdiagnoses. CHS studies to date are limited to case series. The objective was to examine the epidemiology of CHS cases presenting to two major urban tertiary care centre EDs and one urgent care centre over a 2-year period. Using explicit variables, trained abstractors, and standardized abstraction forms, we abstracted data for all adults (ages 18 to 55 years) with a presenting complaint of vomiting and/or a discharge diagnosis of vomiting and/or cyclical vomiting, during a 2-year period. We identified 494 cases: mean age 31 (+/-11) years; 36% male; and 19.4% of charts

specifically reported cannabis use. Among the regular cannabis users (>three times per week), 43% had repeat ED visits for similar complaints. Moreover, of these patients, 92% had bloodwork done in the ED, 92% received intravenous fluids, 89% received antiemetics, 27% received opiates, 19% underwent imaging, 8% were admitted to hospital, and 8% were referred to the gastroenterology service. This study suggests that CHS may be an overlooked diagnosis for nausea and vomiting, a factor that can possibly contribute to unnecessary investigations and treatment in the ED. Additionally, this indicates a lack of screening for CHS on ED history, especially in quantifying cannabis use and eliciting associated symptoms of CHS'.

2017 Nugent et al looked at cannabis and chronic pain. Cannabis is increasingly available for the treatment of chronic pain, yet its efficacy remains uncertain. DATA SOURCES: MEDLINE, Cochrane Database of Systematic Reviews, and several other sources from database inception to March 2017. From 27 chronic pain trials, there is low-strength evidence that cannabis alleviates neuropathic pain but insufficient evidence in other pain populations. Limited evidence suggests that cannabis may alleviate neuropathic pain in some patients, but insufficient evidence exists for other types of chronic pain.

2017 Claudet et al looked at unintentional cannabis intoxication in toddlers. 'In France, cannabis consumption is illegal. The health impact of its increasing use and higher tetrahydrocannabinol (THC) concentrations is still poorly documented, particularly that of unintentional pediatric intoxications. We sought to evaluate the French national trend of admissions for unintentional cannabis intoxication in children over an 11-year period (2004-2014). A retrospective, national, multicenter, observational study of a pediatric cohort. All children aged <6 years admitted to a tertiary-level pediatric emergency department (PED) for proven cannabis intoxication (compatible symptoms and positive toxicological screening results) during the reference period were included. Twenty-four PEDs participated in our study; 235 children were included, and 71% of the patients were 18 months old or younger. Annual admissions increased by a factor of 13. Hashish resin was the main form ingested (72%). During the study period, the evolution was characterized by a national increase in intoxications, younger intoxicated children (1.28 ± 0.4 vs 1.7 ± 0.7 years), and more comas (*n* = 38) (odds ratio 3.5 [1.02-11.8]). Compared with other intoxications, other PED admissions, and the same age population, cannabis-related admissions were greater. There was a potential link between the increased incidence of comas and increased THC concentration in resin seized in France over the period. Children are collateral victims of changing trends in cannabis use and a prevailing THC concentration. Intoxicated children are more frequent, are younger, and have intoxications that are more severe. This raises a real issue of public health'.

2017 Brooks et al looked at the clinical implications of legalising marijuana to see if Physicians etc are prepared. 'We surveyed 114 Colorado-based providers who care for children, adolescents, pregnant and breastfeeding women using a Venue-Day-Time survey methodology throughout Colorado. The survey captured providers' (e.g., physicians, nurses, medical assistants) knowledge of state marijuana laws, risk perceptions, counselling practices, and continued training needs. Providers were knowledgeable about marijuana laws, cautious supporting legalization, and perceived moderate to high risks, particularly for certain groups. About 50% of providers working with adolescents and pregnant or breastfeeding women assessed marijuana use "every" or "most" visits; 23% of those working with children reported such behaviour. Conversations about specific risks varied between groups. Few providers felt completely knowledgeable about marijuana health risks and lacked confidence talking to patients about this issue. CONCLUSIONS:Providers frequently assess patients' marijuana use; however, they are uncomfortable and inconsistent talking to patients about specific marijuana health effects. Additional education is warranted, particularly as it relates to talking to patients about the danger of second hand smoke exposure, underage use, safe storage, and the over-consumption of edibles'.

2017 Barkin et al investigated cannabis-induced acute pancreatitis. 'Cannabis was first reported as a possible cause of acute pancreatitis (AP) in 2004. A search using PubMed/Medline, Embase, Scopus, and Cochrane was performed without language or year limitations to May 1, 2016. Search terms were "Cannabis" and "Acute Pancreatitis" with all permutations. The search yielded 239 results. Acute pancreatitis was defined by meeting 2 of 3 Revised Atlanta Classification criteria. Cannabis-induced AP was defined by preceding use of cannabis and exclusion of common causes of AP when reported. Sixteen papers met inclusion criteria dating from 2004 to 2016.There were 26 cases of cannabis-induced AP (23/26 men; 24/26 under the age of 35 y). Acute pancreatitis correlated with increased cannabis use in 18 patients. Recurrent AP related temporally to cannabis use was reported in 15 of 26. There are 13 reports of no further AP episodes after cannabis cessation. Cannabis is a possible risk

factor for AP and recurrent AP, occurring primarily in young patients under the age of 35 years. Toxicology screens should be considered in all patients with idiopathic AP'.

2017 Richards et al looked at unintentional cannabis ingestion in children. PubMed, OpenGrey, and Google Scholar were systematically searched. Articles were selected, reviewed, and graded using Oxford Center for Evidence-Based Medicine guidelines. Of 3316 articles, 44 were included (3582 children age ≤12 years). We found no high quality (Oxford Center for Evidence-Based Medicine level I or II) studies and 10 level III studies documenting lethargy as the most common presenting sign and confirming increasing incidence of unintentional ingestion in states having decriminalized medical and recreational cannabis. We identified 16 level IV case series, and 28 level V case reports with 114 children, mean age 25.2 ± 18.7 months, range 8 months to 12 years, and 50 female children (44%). The most common ingestion (n = 43, 38%) was cannabis resin, followed by cookies and joints (both n = 15, 13%). Other exposures included passive smoke, medical cannabis, candies, beverages, and hemp oil. Lethargy was the most common presenting sign (n = 81, 71%) followed by ataxia (n = 16, 14%). Tachycardia, mydriasis, and hypotonia were also commonly observed. All cases were cared for in the emergency department or admitted, and mean length of stay was 27.1 ± 27.0 hours. Twenty (18%) were admitted to the pediatric intensive care unit, and 7 (6%) were intubated. Unintentional cannabis ingestion by children is a serious public health concern and is well-documented in numerous studies and case reports. Clinicians should consider cannabis toxicity in any child with sudden onset of lethargy or ataxia'.

2017 Waldinger et al reported a case of cannabis-induced spontaneous orgasm. 'A case is described of a 40 year old woman with persistent spontaneous orgasms after use of Cannabis and five hour hard pounding sexual activity. She presented with severe anxiety in particular to suffer from Restless Genital Syndrome (ReGS). However, she did not fulfill to any of the five criteria of ReGS. It was concluded that her spontaneous orgasms were the result of the use of Cannabis combined with long duration of previous sexual activity. This is not only important for physicians but also for highly exposed subjects like those active in the sex industry'.

2017 Evanoff et al found that physicians in training are not prepared to prescribe medical cannabis. 'While medical marijuana use is legal in more than half of U.S. states, evidence is limited about the preparation of physicians-in-training to prescribe medical marijuana. We asked whether current medical school and graduate medical educational training prepare physicians to prescribe medical marijuana. We conducted a national survey of U.S. medical school curriculum deans, a similar survey of residents and fellows at Washington University in St. Louis, and a query of the Association of American Medical Colleges (AAMC) Curriculum Inventory database for keywords associated with medical marijuana. Surveys were obtained from 101 curriculum deans, and 258 residents and fellows. 145 schools were included in the curriculum search. The majority of deans (66.7%) reported that their graduates were not at all prepared to prescribe medical marijuana, and 25.0% reported that their graduates were not at all prepared to answer questions about medical marijuana. The vast majority of residents and fellows (89.5%) felt not at all prepared to prescribe medical marijuana, while 35.3% felt not at all prepared to answer questions, and 84.9% reported receiving no education in medical school or residency on medical marijuana. Finally, only 9% of medical school curriculums document in the AAMC Curriculum Inventory database content on medical marijuana. Our study highlights a fundamental mismatch between the state-level legalization of medical marijuana and the lack of preparation of physicians-in-training to prescribe it. With even more states on the cusp of legalizing medical marijuana, physician training should adapt to encompass this new reality of medical practice.

2017 Giombi et al asked consumer's for their perceptions of edible marijuana products for recreational use – likes, dislikes and reasons. 'The goal of this research was to provide a better understanding of consumer perceptions of edible marijuana products, including why they prefer edibles relative to other forms of marijuana (e.g., smoking) and their concerns regarding the consumption of edibles. We conducted eight focus groups (four groups in Denver, Colorado, and four groups in Seattle, Washington) in February 2016 with 62 adult consumers of edibles. Most participants preferred edibles to smoking marijuana because there is no smell from smoke and no second-hand smoke. Other reasons participants like edibles included convenience, discreetness, longer-lasting highs, less intense highs, and edibles' ability to aid in relaxation and reduce anxiety more so than smoking marijuana. Concerns and dislikes about edibles included delayed effects, unexpected highs, the unpredictability of the high, and inconsistency of distribution of marijuana in the product. No participants in either location mentioned harmful health effects from consuming edibles as a concern'.

2017 Hamilton et al looked at the therapeutic use of cannabis among adults in Ontario. 'Data were derived from the 2013 and 2014 CAMH Monitor Survey of adults in Ontario, Canada. This repeated cross-sectional survey employed a regionally stratified design and utilized computer-assisted telephone interviewing. Analyses were based on 401 respondents who reported using cannabis.
The data indicated that 28.8% of those who used cannabis in the past year self-reported using cannabis for therapeutic purposes. Of therapeutic users, 15.2% reported having medical approval to use cannabis for therapeutic purposes. Cannabis use for therapeutic purposes was associated with more frequent use of cannabis, a moderate to high risk of problematic cannabis use, and a greater likelihood of using prescription opioids for medical purposes. There was little difference in cannabis use for therapeutic purposes according to sex, age, and marital status after adjusting for opioid use and problematic cannabis use'.

2017 Colorado: Impact of cannabis legalisation. Accounts of increased traffic fatalities, crimes, emergency department admissions, usage among young and older people , flourishing of the black market etc. all contained in 5 volumes to date from The Rocky Mountain High Intensity Trafficking Area.

2017 Meehan-Atrash et al found toxicants in dabbing. Dabbing consists of placing a small amount of cannabis extract -- a dab -- on a heated surface and inhaling the resulting vapour The team analyzed the chemical profile of terpenes -- the fragrant oils in marijuana and other plants -- by vaporizing them in much the same way as a user would vaporize hash oil. The dabbing experiments produced benzene -- a known carcinogen -- at levels many times higher than the ambient air. It also produced high levels of methacrolein, a chemical similar to acrolein, another carcinogen.

2017 Hauser et al looked at cannabinoids in pain management and palliative medicine. 'Of the 750 publications identified, 11 SRs met the inclusion criteria; 3 of them were of high and 8 of moderate methodological quality. 2 prospective long-term observational studies with medical cannabis and 1 with tetrahydrocannabinol/cannabidiol spray (THC/CBD spray) were also analyzed. There is limited evidence for a benefit of THC/CBD spray in the treatment of neuropathic pain. There is inadequate evidence for any benefit of cannabinoids (dronabinol, nabilone, medical cannabis, or THC/CBD spray) to treat cancer pain, pain of rheumatic or gastrointestinal origin, or anorexia in cancer or AIDS. Treatment with cannabis-based medicines is associated with central nervous and psychiatric side effects.The public perception of the efficacy, tolerability, and safety of cannabis-based medicines in pain management and palliative medicine conflicts with the findings of systematic reviews and prospective observational studies conducted according to the standards of evidence-based medicine.

2017 Meir investigated the assocaiations between butane hash oil (BHO) use and cannabis-related problems. A sample of 821 college students were recruited to complete a survey about their health and behavior. Participants who had used cannabis in the past year (33%, n=273) completed questions about their cannabis use, including their use of BHO and cannabis-related problems in eight domains: physical dependence, impaired control, academic-occupational problems, social-interpersonal problems, self-care problems, self-perception, risk behavior, and blackouts.Approximately 44% (n=121) of past-year cannabis users had used BHO in the past year. More frequent BHO use was associated with higher levels of physical dependence (RR=1.8), impaired control (RR=1.3), cannabis-related academic/occupational problems (RR=1.5) poor self-care (RR=1.3), and cannabis-related risk behavior (RR=1.2). After accounting for sociodemographic factors, age of onset of cannabis use, sensation seeking, overall frequency of cannabis use, and frequency of other substance use, BHO use was still associated with higher levels of physical dependence (RR=1.2).BHO use is associated with greater physiological dependence on cannabis, even after accounting for potential confounders. Longitudinal research is needed to determine if cannabis users with higher levels of physiological dependence seek out BHO and/or if BHO use increases risk for physiological dependence.

2017 Abajibor et al looked at substantial childhood maltreatment and young adulthood cannabis use disorders. 'This study investigates the association between exposure to prospectively-substantiated childhood maltreatment between 0 and 14 years of age and lifetime cannabis use, abuse and dependence reported at 21 years. Data were taken from 2526 (51.6% female) participants in the Mater Hospital-University of Queensland Study of Pregnancy, a pre-birth, prospective, cohort study. Prospectively-substantiated cases of childhood maltreatment, reported to the government child protection agencies between 0 and 14 years of age, were linked to CIDI DSM-IV self-report data from the 21-year follow-up. Exposure to any childhood maltreatment, and childhood neglect in particular, predicted subsequent cannabis abuse with adjusted odds ratios (AORs) of 1.79 and 2.62, respectively.

Any childhood maltreatment, physical abuse, emotional abuse and neglect predicted cannabis dependence with AORs of 2.47, 2.81, 2.44 and 2.68, respectively. The associations for an early age of onset of cannabis abuse and dependence were significant and consistent for maltreated children. In addition, frequency of maltreatment substantiations predicted cannabis abuse, dependence and an early age of onset of these disorders. The AORs for cannabis ever use without any DSM-IV cannabis disorder were 1.78 for any maltreatment and 2.15 for emotional abuse. Any childhood maltreatment and neglect predicted lifetime ever cannabis use, as well as cannabis use disorder. There was little evidence for any interaction between gender and different forms of childhood maltreatment and its association with cannabis use disorders. Physical abuse, emotional abuse and neglect, as well as multiple episodes of maltreatment independently predicted cannabis use disorders.

2017 Merlo et al looked at the gender differences in substance use and psychiatric distress among medical students. 'Medical students from all 9 medical schools in the state of Florida were invited via e-mail and/or announcements to complete an anonymous online questionnaire assessing their well-being. Of 5053 matriculating medical students, 1137 (57.1% female) responded to the questionnaire. Descriptive statistics, t tests, and chi-square analyses were computed using SPSS 20.Over 70% of students acknowledged binge drinking, with men reporting higher frequency than women ($\chi2 = 13.90$, $P = .003$), and 22.7% (n = 201) reported marijuana use during medical school, with higher rates ($\chi2 = 9.50$, $P = .02$) among men (27.0%, n = 99) than women (18.9%, n = 93). A significant minority of students reported non-medical use of prescription stimulants and prescription opioids. In addition, 3.3% of male students (n = 12) compared with 0.6% of female students (n = 3) reported problematic drug use. Further, almost 2/3 of respondents reported decreased psychological health since beginning medical school, with women noting greater reductions ($\chi2 = 12.39$, $P = .05$) and higher levels of stress ($\chi2 = 16.30$, $P = .003$). Over 10% of students (n = 102) endorsed "thoughts of committing suicide" during medical school, and 70.1% felt they would benefit from mental healthcare (79.3% of women vs. 59.6% of men; $\chi2 = 41.94$, $P < .001$), although only 39.8% accessed help'.

2017 Romero-Sandoval looked at cannabis and cannabinoids for chronic pain. We found that inhaled (smoked or vaporized) cannabis is consistently effective in reducing chronic non-cancer pain. Oral cannabinoids seem to improve some aspects of chronic pain (sleep and general quality of life), or cancer chronic pain, but they do not seem effective in acute postoperative pain, abdominal chronic pain, or rheumatoid pain. The available literature shows that inhaled cannabis seems to be more tolerable and predictable than oral cannabinoids. Cannabis or cannabinoids are not universally effective for pain. Continued research on cannabis constituents and improving bioavailability for oral cannabinoids is needed. Other aspects of pain management in patients using cannabis require further open discussion: concomitant opioid use, medical vs. recreational cannabis, abuse potential, etc.

2017 'Wong et al investigated medical cannabinoids in children and adolescents. Searching identified 2743 citations, and 103 full texts were reviewed. Searching identified 21 articles that met inclusion criteria, including 22 studies with a total sample of 795 participants. Five randomized controlled trials, 5 retrospective chart reviews, 5 case reports, 4 open-label trials, 2 parent surveys, and 1 case series were identified. Evidence for benefit was strongest for chemotherapy-induced nausea and vomiting, with increasing evidence of benefit for epilepsy. At this time, there is insufficient evidence to support use for spasticity, neuropathic pain, posttraumatic stress disorder, and Tourette syndrome. The methodological quality of studies varied, with the majority of studies lacking control groups, limited by small sample size, and not designed to test for the statistical significance of outcome measures. Studies were heterogeneous in the cannabinoid composition and dosage and lacked long-term follow-up to identify potential adverse effects. Additional research is needed to evaluate the potential role of medical cannabinoids in children and adolescents, especially given increasing accessibility from state legalization and potential psychiatric and neurocognitive adverse effects identified from studies of recreational cannabis use'.

2017 Wang et al found that second-hand marijuana smoke impairs vascular endothelium function. 'Despite public awareness that tobacco second-hand smoke (SHS) is harmful, many people still assume that marijuana SHS is benign. Debates about whether smoke‐free laws should include marijuana are becoming increasingly widespread as marijuana is legalized and the cannabis industry grows. Lack of evidence for marijuana SHS causing acute cardiovascular harm is frequently mistaken for evidence that it is harmless, despite chemical and physical similarity between marijuana and tobacco smoke. We investigated whether brief exposure to marijuana SHS causes acute vascular endothelial dysfunction.We measured endothelial function as femoral artery flow‐mediated dilation (FMD) in rats before and after exposure to marijuana SHS at levels similar to real‐world tobacco SHS

conditions. One minute of exposure to marijuana SHS impaired FMD to a comparable extent as impairment from equal concentrations of tobacco SHS, but recovery was considerably slower for marijuana. Exposure to marijuana SHS directly caused cannabinoid‐independent vasodilation that subsided within 25 minutes, whereas FMD remained impaired for at least 90 minutes. Impairment occurred even when marijuana lacked cannabinoids and rolling paper was omitted. Endothelium‐independent vasodilation by nitroglycerin administration was not impaired. FMD was not impaired by exposure to chamber air. One minute of exposure to marijuana SHS substantially impairs endothelial function in rats for at least 90 minutes, considerably longer than comparable impairment by tobacco SHS. Impairment of FMD does not require cannabinoids, nicotine, or rolling paper smoke. Our findings in rats suggest that SHS can exert similar adverse cardiovascular effects regardless of whether it is from tobacco or marijuana'.

2017 NIDA National Institute of Drug Abuse (USA) September 2017 found that young adults' daily use of marijuana was causing concern. The 2016 drug use data among college/non-college age adults (19-22) was now available. Daily marijuana use is at the highest level since the early 1980s for this age group (7.8%), reaching the highest level seen for non-college youth (12.8%) and among the highest for full-time college students (4.9%).

2017 Harari et al found that teens who drank or smoked marijuana heavily are less likely to marry, go to college, or work full time. 'Researchers examined data from the Collaborative Study on the Genetics of Alcoholism (COGA) to track the effect teenage alcohol and marijuana use has on the achievement of life goals, defined as educational achievement, full time employment, marriage and social economic potential. The study includes 1,165 young adults from across the United States whose habits were first assessed at age 12 and then at two-year intervals until they were between 25 and 34 years old. Most of the study participants had an alcoholic grandparent, parent, aunt or uncle. Overall, individuals who were dependent on either marijuana or alcohol during their teen years achieved lower levels of education, were less likely to be employed full time, were less likely to get married and had lower social economic potential. "This study found that chronic marijuana use in adolescence was negatively associated with achieving important developmental milestones in young adulthood. Awareness of marijuana's potentially deleterious effects will be important moving forward, given the current move in the US toward marijuana legalization for medicinal and possibly recreational use," said study author Elizabeth Harari. The researchers also found that dependence may have a more severe effect on young men. Dependent young men achieved less across all four measures, while dependent women were less likely than non-dependent women to obtain a college degree and had lower social economic potential, but were equally likely to get married or obtain full time employment. Previous research had shown that heavy use of alcohol or marijuana in adolescence affects people developmentally. This study followed up on that, to look at what happens after age 18. The life outcomes seem to show the differences are meaningful into adulthood'.

2017 Delteil et al looked at a case of death by self-mutilation after oral cannabis consumption.

Abstract: Major self-mutilation (amputation, castration, self-inflicted eye injuries) is frequently associated with psychiatric disorders and/or substance abuse. A 35-year-old man presented with behavioral disturbances of sudden onset after oral cannabis consumption and major self-mutilation (attempted amputation of the right arm, self-enucleation of both eyes and impalement) which resulted in death. During the enquiry, four fragments of a substance resembling cannabis resin were seized at the victim's home. Autopsy confirmed that death was related to hemorrhage following the mutilations. Toxicological findings showed cannabinoids in femoral blood (tetrahydrocannabinol (THC) 13.5 ng/mL, 11-hydroxy-tetrahydrocannabinol (11-OH-THC) 4.1 ng/mL, 11-nor-9-carboxy-THC (THC-COOH) 14.7 ng/mL, cannabidiol (CBD) 1.3 ng/mL, cannabinol (CBN) 0.7 ng/mL). Cannabinoid concentrations in hair (1.5 cm brown hair strand/1 segment) were consistent with concentrations measured in chronic users (THC 137 pg/mg, 11-OH-THC 1 pg/mg, CBD 9 pg/mg, CBN 94 pg/mg). Analysis of the fragments seized confirmed that this was cannabis resin with high levels of THC (31-35%).

2017 Min et al found that marijuana use is associated with hypersensitivity to multiple allergens in US adults. A total of 2671 adults (aged 20-59 years) who participated in the 2005-2006 National Health and Nutrition Examination Survey were included. Participants completed a questionnaire on marijuana use and underwent sensitization tests to 19 specific allergens. Those who reported marijuana use for at least 1 day in the past 30 days were considered marijuana users.No difference was found in the history of allergy between marijuana users and non-users. Compared with marijuana non-users as a reference

group, the adjusted odds ratio (AOR) of sensitization to a specific allergen among marijuana users was significantly greater for antibodies against the following: Alternaria alternate, D. farinae, D. pteronyssin, ragweed, ryegrass, Bermuda grass, oak, birch, peanut, and cat dander. We suggest that marijuana use is associated with sensitization to specific allergens, including molds, dust mites, plants, and cat dander.

2017 Goodwin et al looked at Trends in Daily Cannabis Use Among Cigarette Smokers: Abstract: United States, 2002-2014. The National Survey on Drug Use and Health is a nationally representative cross-sectional study conducted annually among persons aged 12 years and older in the United States. Daily cannabis use occurs nearly exclusively among non daily and daily cigarette smokers compared with former and never smokers (8.03%, 9.01%, 2.79%, 1.05%, respectively). Daily cannabis use increased over the past decade among both non daily (8.03% [2014] vs 2.85% [2002]; linear trend $P < .001$) and daily smokers (9.01% [2014]; 4.92% [2002]; linear trend $P < .001$). Daily cannabis use increased most rapidly among former cigarette smokers (2.79% [2014] vs 0.98% [2002]; linear trend $P < .001$).Daily cannabis use occurs predominantly among cigarette smokers in the United States. Daily cannabis use increased among current, former, and never smokers over the past decade, with particularly rapid increases among youth and female cigarette smokers. Future research is needed to monitor the observed increase in daily cannabis use, especially among youths and adults who smoke cigarettes.

2017 Min et al found that **m**arijuana use is associated with hypersensitivity to multiple allergens in US adults. A total of 2671 adults (aged 20-59 years) who participated in the 2005-2006 National Health and Nutrition Examination Survey were included. Participants completed a questionnaire on marijuana use and underwent sensitization tests to 19 specific allergens. Those who reported marijuana use for at least 1 day in the past 30 days were considered marijuana users.No difference was found in the history of allergy between marijuana users and non-users. Compared with marijuana non-users as a reference group, the adjusted odds ratio (AOR) of sensitization to a specific allergen among marijuana users was significantly greater for antibodies against the following: Alternaria alternate, D. farinae, D. pteronyssin, ragweed, ryegrass, Bermuda grass, oak, birch, peanut, and cat dander. We suggest that marijuana use is associated with sensitization to specific allergens, including molds, dust mites, plants, and cat dander.

2017 Rusby et al looked at the legalization of recreational marijuana and community sales policy in Oregon and the impact on adolescent willingness and intent to use, parent use, and adolescent use. Studies investigating the impact of medical marijuana legalization have found no significant changes in adolescent use. In one of the few studies focused on recreational marijuana, we investigated how recreational marijuana legalization and community sales policy influenced factors that likely impact youth use (youth willingness and intent to use, parent use) as well as youth use. Legalization of recreational marijuana in Oregon coincided with our study on adolescent substance use. Cohort 1 transitioned from 8th to 9th grade prior to legalization and Cohort 2 made this transition during legalization ($N = 444$; 53% female). Communities were allowed to opt out of sales. Multivariate linear regression models estimated the impact of legalization and community sales policy on changes in attitudes and parent use (2 time points 1 year apart). Zero-inflated Poisson growth curve models estimated the effects on initial levels and rate of change from 8th through 9th grade (4 time points). In communities opting out of sales, the prior-to-legalization cohort was less likely to increase their willingness and intent to use marijuana, and the legalization cohort was more likely to increase intent to use. For youth who used marijuana, legalization was associated with increased use, and those in communities opting out of sales had greater growth in marijuana use. Community policy appears to impact youth attitudes toward, and use of, marijuana. Results suggest that legalization of recreational marijuana did not increase marijuana use for youth who did not use marijuana but did increase use in youth who were already using.

2017 Phillips et al looked at Marijuana use and associated motives in Colorado university students. College students ($N = 300$; 61% female) were recruited through introductory psychology courses and completed a series of questionnaires and a marijuana urine screen. Almost three-fourths of the sample reported lifetime use of marijuana. Sixty-five percent used marijuana within the last year and 29% tested positive on the urine screen. Hurdle Poisson regression models with a subset of participants ($n = 117$) showed non-Greek and freshman status were associated with increased number of days participants used marijuana in the last month. Problem marijuana use was positively associated with a range of motives-of note-motives focused on coping, boredom, alcohol, and food. Prevalence rates of

marijuana use were high in this sample of college students in a state with legal recreational marijuana use.

2017 Druet et al investigated cannabis and cross allergy with food. ‘Cannabis use has increased over the last decade. At the same time, we see cannabis allergies appearing, ranging from simple rhinoconjunctivitis to anaphylactic-type reactions, some of which are severe since fatal cases have been described, but we also see allergic-induced food allergies cross-linked in the family of lipid transfer proteins (LTP). Indeed, cannabis contains an LTP called Can s 3. The LT are very widespread in the vegetable kingdom and are present in many vegetables and fruits. LTPs have a similar chemical structure and therefore cross-allergy is common. Thus, by becoming aware of the LTP of cannabis, it is possible to become allergic by a mechanism of cross-allergy to the other LTPs present in fruits and vegetables. This syndrome is referred to as cannabis-fruit-vegetable syndrome’.

2017 Richards et al looked at unintentional cannabis ingestion by children. ‘Of 3316 articles, 44 were included (3582 children age ≤12 years). We found no high quality (Oxford Center for Evidence-Based Medicine level I or II) studies and 10 level III studies documenting lethargy as the most common presenting sign and confirming increasing incidence of unintentional ingestion in states having decriminalized medical and recreational cannabis. We identified 16 level IV case series, and 28 level V case reports with 114 children, mean age 25.2 ± 18.7 months, range 8 months to 12 years, and 50 female children (44%). The most common ingestion (n = 43, 38%) was cannabis resin, followed by cookies and joints (both n = 15, 13%). Other exposures included passive smoke, medical cannabis, candies, beverages, and hemp oil. Lethargy was the most common presenting sign (n = 81, 71%) followed by ataxia (n = 16, 14%). Tachycardia, mydriasis, and hypotonia were also commonly observed. All cases were cared for in the emergency department or admitted, and mean length of stay was 27.1 ± 27.0 hours. Twenty (18%) were admitted to the pediatric intensive care unit, and 7 (6%) were intubated.Unintentional cannabis ingestion by children is a serious public health concern and is well-documented in numerous studies and case reports’.

2017 Kerr et al looked at Changes in undergraduates' marijuana, heavy alcohol and cigarette use following legalization of recreational marijuana use in Oregon. Repeated cross-sectional survey data from the 2012-16 administrations of the Healthy Minds Study was used from seven four-year universities in The United States. There were 10 924 undergraduate participants. One large public Oregon university participated in 2014 and 2016 (n = 588 and 1115, respectively); six universities in US states where recreational marijuana use was illegal participated both in 2016 and at least once between 2012 and 2015. Rates of marijuana use increased from pre- to post-2015 at six of the seven universities, a trend that was significant overall. Increases in rates of marijuana use were significantly greater in Oregon than in comparison institutions, but only among students reporting recent heavy alcohol use.Rates of Oregon college students' marijuana use increased (relative to that of students in other states) following recreational marijuana legislation in 2015, but only for those who reported recent heavy use of alcohol.

2017 Terry-McElrath et al looked at time-varying associations between perceived risk and marijuana use among US 12th grade students from 1991 to 2016. Self-reported data on past 12-month marijuana use, perceived risk of regular marijuana use, gender, and race/ethnicity were obtained from 275,768 US 12th grade students participating in the nationally representative Monitoring the Future study. Both before and after controlling for gender and race/ethnicity, perceived risk was a strong protective factor against adolescent marijuana use. The magnitude of the great risk/use association strengthened for Hispanic students; remained generally stable over time for 12th graders overall, males, females, and White students; and weakened for Black students. The magnitude of the moderate risk/use association strengthened for 12th graders overall, males, females, White and Hispanic students, but did not continue to strengthen for Black students from 2005 onwards. In general, marijuana use prevalence decreased over time within all levels of perceived risk. Perceived risk remains a strong protective factor for adolescent marijuana use, and the protective association for moderate risk (vs. no/slight risk) is actually increasing over time. Results suggest that accurate and credible information on the risks associated with marijuana use should remain a key component of prevention efforts.

2017 Arria et al looked at the prevalence and incidence of drug taking among college students. Participants (N = 1,253; 52% female) were young adults who were originally enrolled as first-time, first-year students at a university in the mid-Atlantic US. Annual personal interviews gathered data about the use of seven illicit drugs and three prescription drugs used nonmedically. Annual follow-up rates ranged from 76 to 91%. Marijuana was the most commonly used drug in every year of the study, with the highest annual prevalence estimates in Year 3 (47%wt). In Year 8, when the modal age of

participants was 25, 29%wt used marijuana during the past year. Nonmedical use of prescription drugs was more prevalent during college than in the later years of the study. Although the prevalence of cocaine and ecstasy use was low (cumulative prevalence estimates of 17%wt and 13%wt, respectively), incidence for these drugs was particularly high in the later years of the study. Drug use is prevalent among college students, and drug use persists among young adults, even after many have graduated college.

2017 Holitzki et al looked at the health effects of exposure to second and third-hand marijuana smoke. '6 databases were searched from inception to October 2017. Studies were included if they were human, in vivo or in vitro studies with more than 1 case reported in English or French, and reported original, quantitative data. Three outcomes were extracted: 1) cannabinoids and cannabinoid metabolites in bodily fluids, 2) self-reported psychoactive effects and 3) eye irritation and discomfort. Of the 1701 abstracts identified, 60 proceeded to full-text review; the final data set contained 15 articles. All of the included studies were of good to poor quality as assessed with the Downs and Black checklist. There is evidence of a direct relation between the tetrahydrocannabinol content of marijuana and effects on those passively exposed. This relation is mediated by several environmental factors including the amount of smoke, ventilation, air volume, number of marijuana cigarettes lit and number of smokers present. No evidence was identified assessing exposure to third-hand marijuana smoke or the health effects of long-term exposure.

2017 Nappe et al investigated a pediatric death due to myocarditis after exposure to cannabis. Abstract: Since marijuana legalisation, pediatric exposures to cannabis have increased.To date, pediatric deaths from cannabis exposure have not been reported. The authors report an eleven month old male who, following cannabis exposure, presented with central nervous system depression after seizure, and progressed to cardiac arrest and died. Myocarditis was diagnosed post mortem and cannabis exposure was confirmed. Given the temporal relationship of these two rare occurencies – cannabis exposure and sudden death secondary to myocarditis in an 11-month old – as well as histological consistency with drug-induced myocarditis, without confirmed alternate causes, and prior reported cases of cannabis-associated myocarditis, a possible relationship exists between cannabis exposure in this child and myocarditis leading to death. In areas where cannabis is commercially available or decriminalised, the authors urge clinicians to preventively counsel parents and to include cannabis exposure in the differential diagnosisof patients pesenting with myocarditis.

2017 Olfson et al looked at cannabis use and the risk of prescription opioid use disorder in the United States. 'The authors used logistic regression models to assess prospective associations between cannabis use at wave 1 (2001–2002) and nonmedical prescription opioid use and prescription opioid use disorder at wave 2 (2004–2005) of the National Epidemiologic Survey on Alcohol and Related Conditions. Corresponding analyses were performed among adults with moderate or more severe pain and with nonmedical opioid use at wave 1. Cannabis and prescription opioid use were measured with a structured interview (the Alcohol Use Disorder and Associated Disabilities Interview Schedule–DSM-IV version). Other covariates included age, sex, race/ethnicity, anxiety or mood disorders, family history of drug, alcohol, and behavioral problems, and, in opioid use disorder analyses, nonmedical opioid use. In logistic regression models, cannabis use at wave 1 was associated with increased incident nonmedical prescription opioid use (odds ratio=5.78) and opioid use disorder (odds ratio=7.76) at wave 2. These associations remained significant after adjustment for background characteristics (nonmedical opioid use: adjusted odds ratio=2.62, opioid use disorder: adjusted odds ratio=2.18). Among adults with pain at wave 1, cannabis use was also associated with increased incident nonmedical opioid use (adjusted odds ratio=2.99) at wave 2; it was also associated with increased incident prescription opioid use disorder, although the association fell short of significance (adjusted odds ratio=2.14). Among adults with nonmedical opioid use at wave 1, cannabis use was also associated with an increase in nonmedical opioid use (adjusted odds ratio=3.13). Cannabis use appears to increase rather than decrease the risk of developing nonmedical prescription opioid use and opioid use disorder.

2017 Franklyn et al investigated the impact of cannabis use on patients enrolled in opioid agonist therapy in Ontario. 'A retrospective cohort study was conducted using anonymized electronic medical records from 58 clinics offering opioid agonist therapy in Ontario, Canada. One-year treatment retention was the primary outcome of interest and was measured for patients who did and did not have a cannabis positive urine sample in their first month of treatment, and as a function of the proportion of cannabis-positive urine samples throughout treatment. Our cohort consisted of 644 patients, 328 of which were considered baseline cannabis users and 256 considered heavy users. Patients with baseline cannabis use and heavy cannabis use were at increased risk of dropout (38.9% and 48.1%, respectively). When evaluating these trends by gender, only female baseline users and male heavy

users are at increased risk of premature dropout. Both baseline and heavy cannabis use are predictive of decreased treatment retention, and differences do exist between genders. With cannabis being legalized in the near future, physicians should closely monitor cannabis-using patients and provide education surrounding the potential harms of using cannabis while receiving treatment for opioid use disorder.

2017 Amato et al c**ondu**cted a **s**ystematic review of safeness and therapeutic efficacy of cannabis in patients with multiple sclerosis, neuropathic pain, and in oncological patients treated with chemotherapy. Abstract: medical cannabis refers to the use of cannabis or cannabinoids as medical therapy to treat disease or alleviate symptoms. In the United States, 23 states and Washington DC (May 2015) have introduced laws to permit the medical use of cannabis. Within the European Union, medicinal cannabis laws and praxis vary wildly between Countries. The aim was to provide evidence for benefits and harms of cannabis (including extracts and tinctures) treatment for adults in the following indications: control of spasticity and pain in patients with multiple sclerosis; control of pain in patients with chronic neuropathic pain; control of nausea and vomiting in adults with cancer receiving chemotherapy.we searched the Cochrane Central Register of Controlled Trials, PubMed, and EMBASE from inception to September 2016. We also searched for on-going studies via ClinicalTrials.gov and the World Health Organization and International Clinical Trials Registry Platform (ICTRP) search portal. All searches included also non-English language literature. All relevant randomized controlled trials (RCTs) evaluating the safety and efficacy of cannabis (including extracts and tinctures) compared with placebo or other pharmacological agents were included. Three authors independently evaluated the titles and abstracts of studies identified in the literature searches for their eligibility. For studies considered eligible, we retrieved full texts. Three investigators independently extracted data. For the assessment of the quality of evidence, we used the standard methodological procedures recommended by Cochrane and GRADE working Group.41 trials (4,550 participants) were included; 15 studies considered efficacy and safety of cannabis for patients with multiple sclerosis, 12 for patients with chronic pain, and 14 for patients with cancer receiving chemotherapy. The included studies were published between 1975 and 2015, and the majority of them were conducted in Europe. We judged almost 50% of these studies to be at low risk of bias. The large majority (80%) of the comparisons were with placebo; only 8 studies included patients with cancer receiving chemotherapy comparing cannabis with other antiemetic drugs. Concerning the efficacy of cannabis (compared with placebo) in patients with multiple sclerosis, confidence in the estimate was high in favour of cannabis for spasticity (numerical rating scale and visual analogue scale, but not the Ashworth scale) and pain. For chronic and neuropathic pain (compared with placebo), there was evidence of a small effect; however, confidence in the estimate is low and these results could not be considered conclusive. There is uncertainty whether cannabis, including extracts and tinctures, compared with placebo or other antiemetic drugs reduces nausea and vomiting in patients with cancer requiring chemotherapy, although the confidence in the estimate of the effect was low or very low. In the included studies, many adverse events were reported and none of the studies assessed the development of abuse or dependence. There is incomplete evidence of the efficacy and safety of medical use of cannabis in the clinical contexts considered in this review. Furthermore, for many of the outcomes considered, the confidence in the estimate of the effect was again low or very low. To give conclusive answers to the efficacy and safety of cannabis used for medical purposes in the clinical contexts considered, further studies are needed, with higher quality, larger sample sizes, and possibly using the same diagnostic tools for evaluating outcomes of interest.

2017 Patrick looked at patterns of simultaneous and concurrent alcohol and marijuana use among adolescents. ‘Data from US-national samples of 12th graders (N = 84,805, 48.4% female) who participated in the Monitoring the Future study from 1976 to 2016 and who used alcohol and/or marijuana in the past 12 months were used to identify latent classes of alcohol use, marijuana use, and simultaneous alcohol and marijuana (SAM) use. A four-class solution indicated four patterns of use among adolescents: (1) Simultaneous alcohol and marijuana (SAM) use with binge drinking and recent marijuana use (SAM-Heavier Use; 11.2%); (2) SAM use without binge drinking and with recent marijuana use (SAM-Lighter Use; 21.6%); (3) Marijuana use and alcohol use but no SAM use (Concurrent Use; 10.7%); and (4) Alcohol use but no marijuana or SAM use (Alcohol-Only Use; 56.4%). Membership in either SAM use class was associated with a higher likelihood of truancy, evenings out, and use of illicit drugs other than marijuana. SAM-Heavier Use, compared to SAM-Lighter Use, class members were more likely to report these behaviors and be male, and less likely to have college plans’.

2017 Drouet et al loked at cannabis and crossed allergy with food. Abstract: ‘Cannabis use has increased over the last decade. At the same time, we see cannabis allergies appearing, ranging from

simple rhinoconjunctivitis to anaphylactic-type reactions, some of which are severe since fatal cases have been described, but we also see allergic-induced food allergies cross-linked in the family of lipid transfer proteins (LTP). Indeed, cannabis contains an LTP called Can s 3. The LT are very widespread in the vegetable kingdom and are present in many vegetables and fruits. LTPs have a similar chemical structure and therefore cross-allergy is common. Thus, by becoming aware of the LTP of cannabis, it is possible to become allergic by a mechanism of cross-allergy to the other LTPs present in fruits and vegetables. This syndrome is referred to as cannabis-fruit-vegetable syndrome'.

2017 Borodovsky et al legal cannabis laws, home cultivation and use of edible cannabis products. Abstract: 'Over half of U.S. states have enacted legal cannabis laws (LCL). In parallel, edible cannabis products (i.e., edibles) have presented new regulatory challenges. LCL provisions that dictate access to cannabis (e.g., home cultivation (HC) or dispensaries (DSP)) may impact edible production and use. This study examined relationships among HC and DSP provisions, cannabis cultivation, and edible use. An online cannabis use survey was distributed using Facebook. Data were collected from 1813 cannabis-using adults. U.S. states were classified as states without LCL (Non-LCL) or LCL states that: (1) only permit DSP (LCL DSP-only), (2) only permit HC (LCL HC-only), or (3) permit HC and DSP (LCL HC+DSP). Analyses tested associations among these classifications, cannabis growing, and edible use and procurement. Individuals in LCL HC-only and LCL HC+DSP states were more likely to report currently growing cannabis at home (OR: 3.3, OR: 3.9, respectively) and past-month edible use (OR: 2.1, OR: 2.9, respectively) than individuals in LCL DSP-only states. Regardless of state, those who had grown cannabis were more likely to have made edibles than those who had never grown cannabis (OR: 2.2). Individuals in LCL HC-only states were more likely to have made edibles in the past month than individuals from Non-LCL (OR: 2.75) and DSP-only states (OR: 2.1), Individuals in LCL HC+DSP states were more likely to have purchased edibles in the past month than individuals from Non-LCL (OR: 3.7) and DSP-only states (OR: 3.2).Specific LCL provisions may differentially affect individuals' propensity to grow cannabis and make, buy, and use edible cannabis products. Permitting home cultivation contributes to a greater likelihood of growing cannabis. Those who grow cannabis economize the plant by creating homemade edible cannabis products. Conversely, permitting dispensaries increases the likelihood of purchasing edibles. The psychoactive effects of edibles with unknown and variable cannabinoid content will be unpredictable. Policymakers should carefully consider how specific LCL provisions can affect patterns of cannabis edible product access and quality.

2017 Beaulieu investigated the anesthetic implications on recreational drug use. 'Addicted patients may present for anesthetic care in a variety of circumstances in everyday elective surgeries or in acute or life-saving situations, such as emergency Cesarean delivery or trauma surgery. Therefore, it is important for anesthesiologists to know about the most common illicit drugs being used, their clinical presentation and side effects, and the anesthetic options that are beneficial or detrimental to these patients. The most frequently used illicit substances, apart from alcohol and tobacco, are cannabis, cocaine, heroin, prescription opioids, methamphetamine, and hallucinogens. When planning anesthetic care, it is important for anesthesiologists to understand the effects of these agents, including various drug interactions, to predict tolerance to some anesthetic agents, to recognize drug withdrawal signs and symptoms, and to be prepared to manage all these factors in the perioperative period'.

2017 Hasin looked at the epidemiology of cannabis use and associated problems. Abstract: 'This review provides an overview of the changing US epidemiology of cannabis use and associated problems. Adults and adolescents increasingly view cannabis as harmless, and some can use cannabis without harm. However, potential problems include harms from prenatal exposure and unintentional childhood exposure; decline in educational or occupational functioning after early adolescent use, and in adulthood, impaired driving and vehicle crashes; cannabis use disorders (CUD), cannabis withdrawal, and psychiatric comorbidity. Evidence suggests national increases in cannabis potency, prenatal and unintentional childhood exposure; and in adults, increased use, CUD, cannabis-related emergency room visits, and fatal vehicle crashes. Twenty-nine states have medical marijuana laws (MMLs) and of these, 8 have recreational marijuana laws (RMLs). Many studies indicate that MMLs or their specific provisions did not increase adolescent cannabis use. However, the more limited literature suggests that MMLs have led to increased cannabis potency, unintentional childhood exposures, adult cannabis use,and adult CUD. Ecological-level studies suggest that MMLs have led to substitution of cannabis for opioids, and also possiblyfor psychiatric medications. Much remains to be determined about cannabis trends and the role of MMLs and RMLs in these trends. The public, health professionals, and policy makers would benefit from education about the risks of cannabis use, the increases in such risks, and the role of marijuana laws in these increases'.

2017 Szutorisz et al looked at the epigenetic issues to do with cannabis (epigenic imprint and legacy on brain and behaviour). Abstract: 'Extensive debates continue regarding marijuana (Cannabis spp), the most commonly used illicit substance in many countries worldwide. There has been an exponential increase of cannabis studies over the past two decades but the drug's long-term effects still lack in-depth scientific data. The epigenome is a critical molecular machinery with the capacity to maintain persistent alterations of gene expression and behaviors induced by cannabinoids that have been observed across the individual's lifespan and even into the subsequent generation. Though mechanistic investigations regarding the consequences of developmental cannabis exposure remain sparse, human and animal studies have begun to reveal specific epigenetic disruptions in the brain and the periphery. In this article, we focus attention on long-term disturbances in epigenetic regulation in relation to prenatal, adolescent and parental germline cannabinoid exposure. Expanding knowledge about the protracted molecular memory could help to identify novel targets to develop preventive strategies and treatments for behaviors relevant to neuropsychiatric risks associated with developmental cannabis exposure.

2017 Chinello et al looked at canabinoid poisoning by hemp seed oil in a child. Abstract: We report a case of mild cannabinoid poisoning in a preschool child, after 3-week ingestion of hemp seed oil prescribed by his pediatrician to strengthen his immune system. The patient presented neurological symptoms that disappeared after intravenous hydration. A possible mild withdrawal syndrome was reported after discharge. The main metabolite of Δ-tetrahydrocannabinol was detected in urine, and very low concentration of Δ-tetrahydrocannabinol was detected in the ingested product. This is, as far as we know, the first report of cannabinoid poisoning after medical prescription of hemp seed oil in a preschool child.

2017 Wang et al looked at marijuana and acute health care contacts in Colorado. Abstract: Over 22 million Americans are current users of marijuana; half of US states allow medical marijuana, and several allow recreational marijuana. The objective of this study was to evaluate the impact marijuana has on hospitalizations, emergency department (ED) visits, and regional poison center (RPC) calls in Colorado, a medical and recreational marijuana state. This is a retrospective review using Colorado Hospital Association hospitalizations and ED visits with marijuana-related billing codes, and RPC marijuana exposure calls. Legalization of marijuana in Colorado has been associated with an increase in hospitalizations, ED visits, and RPC calls linked with marijuana exposure. From 2000 to 2015, hospitalization rates with marijuana-related billing codes increased from 274 to 593 per 100,000 hospitalizations in 2015. Overall, the prevalence of mental illness among ED visits with marijuana-related codes was five-fold higher (5.07, 95% CI: 5.0, 5.1) than the prevalence of mental illness without marijuana-related codes. RPC calls remained constant from 2000 through 2009. However, in 2010, after local medical marijuana policy liberalization, the number of marijuana exposure calls significantly increased from 42 to 93; in 2014, after recreational legalization, calls significantly increased by 79.7%, from 123 to 221 ($p<0.0001$). The age group <17years old also had an increase in calls after 2014. As more states legalize marijuana, it is important to address public education and youth prevention, and understand the impact on mental health disorders. Improvements in data collection and surveillance methods are needed to more accurately evaluate the public health impact of marijuana legalization.

2018 Shapiro et al looked at cryptococcal meningitis in a daily cannabis smoker without evidence of immunodeficiency. Cryptococcal meningitis is a life-threatening condition most commonly observed in immunocompromised individuals. We describe a daily cannabis smoker without evidence of immunodeficiency presenting with confirmed Cryptococcus neoformans meningitis. An investigation of cannabis samples from the patient's preferred dispensary demonstrated contamination with several varieties of Cryptococcus, including C. neoformans, and other opportunistic fungi. These findings raise concern regarding the safety of dispensary-grade cannabis, even in immunocompetent users.

2018 Nugent et al looked at patterns and correlates of medical cannabis use for pain among patients prescribed long-term opioid therapy. Abstract: Little is known about co-occurring long-term opioid therapy (LTOT) and medical cannabis use. We compared characteristics of patients prescribed LTOT who endorsed using medical cannabis for pain to patients who did not report cannabis use. Participants (n=371) prescribed LTOT completed self-report measures about pain, substance use, and mental health. Eighteen percent of participants endorsed using medical cannabis for pain. No significant differences were detected on pain-related variables, depression, or anxiety between those who endorsed medical cannabis use and those who did not. Medical cannabis users had higher scores of risk for prescription

opioid misuse (median=17.0 vs. 11.5, p<0.001), rates of hazardous alcohol use (25% vs. 16%, p<0.05), and rates of nicotine use (42% vs. 26%, p=0.01). Multivariable analyses indicated that medical cannabis use was significantly associated with risk of prescription opioid misuse (β=0.17, p=0.001), but not hazardous alcohol use (aOR=1.96, 95% CI=0.96-4.00, p=0.06) or nicotine use (aOR=1.61, 95% CI=0.90-2.88, p=0.11). There are potential risks associated with co-occurring LTOT and medical cannabis for pain. Study findings highlight the need for further clinical evaluation in this population. Future research is needed to examine the longitudinal impact of medical cannabis use on pain-related and substance use outcomes.

2018 Potter et al looked at the potency of THC and other cannabinoids in cannabis in 2016. Abstract: In 2005 and 2008, studies reported that cannabis in England had become dominated by the sinsemilla (unseeded female) form. The average potency (Δ9 -tetrahydrocannabinol [THC] content) of this material had doubled over the previous decade. Cannabis resin then circulating contained approximately equal ratios of THC and cannabidiol (CBD), whereas sinsemilla was almost devoid of CBD. Despite raised health concerns regarding sinsemilla use and the development of psychotic disorders, no update on street cannabis potency has been published since 2008. A total of 995 seized cannabis samples were acquired from the same 5 constabulary areas included in the 2005 study. The differing forms were segregated, and a representative 460 samples analyzed to assess their cannabinoid content using gas chromatography. The resultant median sinsemilla potency of 14.2% THC was similar to that observed in 2005 (13.9%). In each case, sinsemilla contained minimal CBD. Compared with 2005, resin had significantly higher mean THC (6.3%) and lower CBD (2.3%) contents ($p < 0.0001$). Although the average THC concentration in sinsemilla samples across the 5 constabularies has remained stable since 2005, the availability of this potent form of cannabis has further increased. Moreover, the now rarer resin samples show significantly decreased CBD contents and CBD:THC ratios, leaving the United Kingdom's cannabis street market populated by high-potency varieties of cannabis, which may have concerning implications for public health.

2018 Kelly et al looked at recovery from cannabis problems compared with other drugs.

Abstract: 9.1% of the US adult population reported resolving a significant substance problem, and of these, 10.97% were CAN. Compared to ALC ($M = 49.79$) or OTH ($M = 43.80$), CAN were significantly younger ($M = 39.41$, $p < 0.01$), had the earliest onset of regular use (CAN $M = 16.89$, ALC $M = 19.02$, OTH $M = 23.29$, $p < 0.01$), and resolved their problem significantly earlier (CAN $M = 28.87$, ALC $M = 37.86$, OTH $M = 33.06$, $p < 0.01$). Compared to both ALC and OTH, CAN were significantly less likely to report use of inpatient treatment and used substantially less outpatient treatment, overall ($p < 0.01$), although CAN resolving problems more recently were more likely to have used outpatient treatment ($p < 0.01$). Lifetime attendance at mutual-help meetings (e.g., AA) was similar, but CAN ($M = 1.67$) had substantially lower recent attendance compared to ALC ($M = 7.70$) and OTH ($M = 7.65$). QOL indices were similar across groups.Approximately 2.4 million Americans have resolved a significant cannabis problem. Compared to ALC and OTH, the pattern of findings for CAN suggest similarities but also some notable differences in characteristics and problem resolution pathways particularly regarding earlier problem offset and less use of formal and informal services. Within a shifting policy landscape, research is needed to understand how increases in population exposure and potency may affect the nature and magnitude of differences observed in this preliminary study.

2018 NIDA produced a general information paper - What are the effects of secondhand exposure to marijuana smoke? Ref: https://www.drugabuse.gov/publications/marijuana/what-are-effects-secondhand-exposure-to-marijuana-smoke References to specific papaers are given in this link.

2018 Weinberger et al looked at cannabis use and increased risk of cigarette smoking, initiation, persistence and relapse. Abstract: Analyses included respondents who completed Waves 1 (2001-2002) and 2 (2004-2005) of the National Epidemiologic Survey on Alcohol and Related Conditions and responded to questions about cannabis use and smoking status (n = 34,639). Multivariable logistic regression models were used to calculate the odds of cigarette use at Wave 2 among Wave 1 daily smokers, nondaily smokers, former smokers, and nonsmokers by Wave 1 cannabis use. In unadjusted analyses, Wave 1 cannabis use was associated with increased odds of Wave 2 daily and nondaily smoking for Wave 1 nonsmokers (daily OR = 2.90; 95% CI, 2.10-4.00; nondaily OR = 4.45; 95% CI, 3.97-5.00) and Wave 2 relapse to daily and nondaily smoking for Wave 1 former smokers (daily OR = 4.18, 95% CI, 3.01-5.81; nondaily OR = 5.24; 95% CI, 3.74-7.34). Wave 1 cannabis use was associated with decreased odds of Wave 2 smoking cessation for Wave 1 daily cigarette smokers (OR = 0.57; 95% CI, 0.51-0.64). The associations remained significant for daily smoking initiation (OR = 1.43; 95% CI, 1.06-1.93), daily smoking relapse (OR = 1.47; 95% CI, 1.00-2.16), and smoking cessation

(OR = 0.77; 95% CI, 0.69-0.87) after adjusting for demographics and psychiatric disorders. Associations remained significant for nondaily smoking initiation (OR = 1.85; 95% CI, 1.59-2.16) and nondaily smoking relapse (OR = 1.63; 95% CI, 1.05-2.54) after adjusting for these covariates as well as for alcohol and substance use disorders. Cannabis use was associated with increased initiation of, persistence of, and relapse to cigarette smoking.

JAMA 2 Papers on legal medical cannabis and decline of opiod use in USA April 2018 and 'Invited Comment' on subject Aprl 2018

A slew of news articles flooded the print, broadcast, and internet media this week about two new studies published in Monday's online issue of *JAMA Internal Medicine*. One study found that states with medical marijuana laws are associated with reductions in Medicare Part D opioid prescriptions, compared to states that do not have such laws. The other found a similar association in states with both medical and recreational marijuana laws in the Medicaid population. Lead author of the first study is David Bradford, PhD, at the School of Public and International Affairs of the University of Georgia. UGA sent out a press release promoting Dr. Bradford's study with this title: "SPIA Professor Pens New Study: Legalized Medical Cannabis Lowers Opioid Use."**Not quite.**

Dr. Bradford's study finds a correlation between states with medical marijuana laws and a reduction in opioid *prescriptions*, not use. And only in the *Medicare Part D population*, not the whole population. Dr. Bradford himself notes this when citing the study's limitations in his journal article. Yet many of the news stories picked up his university's headline.

And he pushed this misinformation along in interviews he gave to the press, telling the Cox Media Group, "'There are substantial reductions in opiate use' in states that have initiated dispensaries for medical marijuana," when in fact there are significant reductions in opioid prescriptions rather than use.

Dr. Bradford also tells his interviewers that the 2017 National Academies of Sciences, Engineering, and Medicine (NAS) review of the marijuana literature found "conclusive evidence that there are benefits to cannabis for chronic pain in adults, for nausea associated with chemotherapy, and for spasticity and seizures." He doesn't understand that all of the evidence for the last three conditions and most of it for chronic pain came from randomized controlled trials of purified cannabinoids rather the kinds of marijuana states have legalized for medical use.

He tells AP reporter Malcolm Ritter that the NAS report presents evidence that is "hard to ignore" and therefore federal laws should be changed to allow doctors to prescribe marijuana for pain treatment.

An accompanying editorial in the journal by two physicians not affiliated with these studies notes that other studies find legal marijuana *increases* opioid use. They warn than marijuana policy has gotten far ahead of marijuana science and we must remedy this quickly.

Perhaps people with chronic pain will get more relief from purified cannabinoids than opioids, but we won't know that until randomized, controlled trials are conducted to find out if that's true. At best, ecological studies like the two published this week can push us towards research, but certainly not policy.

Read Invited comment:"The Role of Cannabis Legalization in the Opioid Crisis"
https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2676997 Hill et al

Read "Association Between US State Medical Cannabis Laws and Opioid Prescribing in the Medicare Part D Population" Bradford et al
https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2676999

Read "Association of Medical and Adult-Use Marijuana Laws With Opioid Prescribing for Medicaid Enrollees".
https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2677000 Wen et al

2018 Caputi et al investigated whether medical marijuana users were more likely to use prescription medicines. Abstract Objectives: Previous studies have found a negative population-level correlation between medical marijuana availability in US states, and trends in medical and nonmedical prescription drug use. These studies have been interpreted as evidence that use of medical marijuana reduces medical and nonmedical prescription drug use. This study evaluates whether medical marijuana use is a risk or protective factor for medical and nonmedical prescription drug use. Methods: Simulations based upon logistic regression analyses of data from the 2015 National Survey on Drug Use and Health were used to compute associations between medical marijuana use, and medical and nonmedical prescription drug use. Adjusted risk ratios (RRs) were computed with controls added for age, sex, race, health status, family income, and living in a state with legalized medical marijuana. Results: Medical marijuana users were significantly more likely (RR 1.62, 95% confidence interval [CI] 1.50-1.74) to report medical use of prescription drugs in the past 12 months. Individuals who used medical marijuana were also significantly more likely to report nonmedical use in the past 12 months of any prescription drug (RR 2.12, 95% CI 1.67-2.62), with elevated risks for pain relievers (RR 1.95, 95% CI 1.41-2.62), stimulants (RR 1.86, 95% CI 1.09-3.02), and tranquilizers (RR 2.18, 95% CI 1.45-3.16). Conclusions: Our findings disconfirm the hypothesis that a population-level negative correlation between medical marijuana use and prescription drug harms occurs because medical marijuana users are less likely to

use prescription drugs, either medically or nonmedically. Medical marijuana users should be a target population in efforts to combat nonmedical prescription drug use.

2018 Caputi et al Looked at the numbers of Americans who seek and find illicit marijuana online. To observe the online marijuana market place, Google searches in the US between January 2005 and June 2017 that included the words marijuana, weed, pot, cannabis combined with terms such as buy, shop or order, were carried out. They found that shopping searches nearly tripled in the US from 2005 to 2017, peaking between 1.4 million and 2.4 million each month. Highest numbers of searches were found in Washington, Oregon, Colorado and Nevada. The annual growth rate in searching for these terms increased in all but 2 states, Alabama and Mississippi. Three out of every four searches resulted in a mail-order marijuana retailer as the very first suggested link. Anyone, of any age can buy marijuana from their smartphone wherever they live.

2018 Vo et al looked at the dangers of eating edibles containg THC. Twelve children and 9 adults were identified, with 16 patients having detectable serum THC and THC metabolites. All patients presented to hospitals with a variety of constitutional symptoms and all were discharged home within 12 hours. In general, pediatric patients had more severe symptoms and longer hospital length of stay, and, uniquely, a majority presented with leukocytosis and elevated lactic acid levels. We recommend that efforts be made to increase general public awareness in regard to the potential hazards of THC-containing edibles resembling commercially available food products.

2018 Dai et al investigated electronic cigarettes and future marijuana use. Absract: Youth (aged 12‐17 years) never marijuana users at wave 1 (n = 10 364; 2013‐2014) from the Population Assessment of Tobacco and Health study were followed-up in 1 year (wave 2, 2014‐2015). Multivariable logistic regressions were performed to evaluate associations between e-cigarette use at wave 1 and ever/heavy marijuana use in the past 12 months (P12M) and at wave 2. Among never marijuana users, e-cigarette ever use (versus never use) at wave 1 was associated with increased likelihood of marijuana P12M use (adjusted odds ratio [aOR] = 1.9; 95% confidence interval [CI]: 1.4‐2.5) at wave 2. There was a significant interaction between e-cigarette use and age (P < .05) with aOR = 2.7 (95% CI: 1.7‐4.3) for adolescents aged 12 to 14 and aOR = 1.6 (95% CI: 1.2‐2.3) for adolescents aged 15 to 17. The association with heavy marijuana use was significant among younger adolescents (aOR = 2.5; 95% CI: 1.2‐5.3) but was not among older adolescents. Heavier e-cigarette use at wave 1 yielded higher odds of P12M and heavy marijuana use at wave 2 for younger adolescents. E-cigarette use predicts subsequent marijuana use among youth, with a stronger associations among young adolescents. Reducing youth access to e-cigarettes may decrease downstream marijuana use.

2018 Kenne et al looked at the use of substances other than nicotine in electronic cigarettes among college students. Absract: Cross-sectional data from 1542 undergraduate college student e-cigarette users from a large Midwestern university were collected via online survey to assess prevalence of e-cigarette use, reasons for use, perceived harm, and prevalence and predictors of OSUE (Other Substance Use in E-Cigarettes). Nearly 7% (6.94%) reported using an e-cigarette to vaporize and inhale a substance other than nicotine. Current tobacco cigarette smokers were significantly more likely to report OSUE (51.0%) as compared with never (33.7%) and former (15.4%) smokers. Among respondents reporting OSUE, the primary reason for e-cigarette use was “safer than cigarettes” (21.7%), followed by “experimentation” (18.9%) and “friends use” (17.0%). Most (77.9%) reported using cannabis or some derivative of cannabis in an e-cigarette. Binomial logistic regression found that women were less likely to report OSUE by a factor of 0.60, former tobacco cigarette smokers as compared with never smokers were more likely to report OSUE by a factor of 1.87, and e-cigarette users who reported using e-cigarettes for “cool or trendy” reasons were more likely to report OSUE by a factor of 2.89. Little is known regarding the health effects of cannabis and cannabis derivatives delivered through e-cigarettes. Concern may also be warranted regarding the potential dangers of this young population using substances more dangerous than cannabis in e-cigarettes. Knowledge is limited regarding the public health impact of vaping cannabis or other illicit substances among college student populations.

2018 Frohe et al looked for correlates of cannabis vape-pen use and knowledge among US college students. Abstract: The proliferation of electronic devices, such as vape-pens, has provided alternative means for cannabis use. Research has found cannabis-vaping (i.e., vape-pen use) is associated with lower perceived risks and higher cannabis use. Knowledge of these products may increase likelihood of subsequent use. As policies for cannabis shift, beliefs that peers and family approve of this substance use (injunctive norms) increase and there has been an increase in vape-pen use among young adults (18–35 year olds); however, correlates thereof remain unknown. Young adults often engage in cross-substance use with cannabis and alcohol, making alcohol a potential correlate of cannabis vape-pen use

and knowledge. Therefore, we examined alcohol use and other potential correlates of vape-pen use and knowledge among a sample of university students. This secondary data analysis utilized surveys at multiple colleges in the U.S. (N = 270). Alcohol use, social anxiety, cannabis expectancies, injunctive and descriptive norms and facets of impulsivity were examined as correlates of vape-pen use and knowledge using bivariate correlations and logistic regressions.
Alcohol use was correlated with cannabis vape-pen use and knowledge. Frequency of cannabis use, peer injunctive norms, and positive expectancies were associated with increased likelihood of vape-pen use. Lack of premeditation, a facet of impulsivity, was associated with cannabis vape-pen knowledge.

2018 Wilhite et al investigated freshman year alcohol and marijuana use prospectively predict time to college graduation and subsequent adult roles and independence. Abstact: Participants were part of a longitudinal study that began in 2004. The first analyses focused on freshman year (*N* = 2,050). The second analyses corresponded to a subset of participants at age 27 (*N* = 575). Measures included self-reported substance use, adult role adoption, and university reported graduation dates. Results indicated that frequent binge drinking and marijuana use during freshman year predicted delayed college graduation. Those who took longer to graduate were more likely to have lower incomes and were less likely to obtain a graduate degree. Taking 5–6 years to graduate was associated with greater likelihood of alcohol-related problems.

2018 Pediatric Academic Societies Meeting looked at the correlation between second-hand marijuana and tobacco smoke exposure and children ED visits. The research included a cross-sectional survey of caregivers of children presenting to the ED of an urban, tertiary care, academic children's hospital in Colorado. Data collected included caregiver demographics and use of tobacco and/or marijuana, along with index child medical history, number of overall ED visits and number of tobacco sensitive conditions in the prior year. Caregivers were classified into four categories depending on use: marijuana use only, tobacco use only, both tobacco and marijuana use, and neither marijuana nor tobacco use (control group). Poisson regression models were created to determine differences in overall ED visitation, as well as tobacco sensitive conditions. Results were expressed using incident rate ratios (IRR) and 95% confidence intervals. A total of 1,500 caregivers completed the survey. The survey found that overall, 140 caregivers (9.2 percent, 95%CI = 7.7-10.7 percent) reported regularly smoking marijuana, and 285 caregivers (19 percent, 17.1-21.1 percent) reported regularly smoking tobacco. Exposure groups included: marijuana only (n=62, 4.1 percent), tobacco only (n=213, 14.2 percent), marijuana and tobacco (n=75, 5percent), and unexposed (n=1147, 76.6 percent). When compared against each other, all groups had a similar rate of ED visitation other than the marijuana and tobacco group which had a significantly higher rate of ED visits compared to the controls. Children in the marijuana + tobacco group also had a statistically significant increase in otitis media episodes compared to controls (IRR = 1.81, 95%CI = 1.38, 2.35); differences were not elicited among the other groups or for other tobacco sensitive conditions.

2018 Molina et al looked at substance use through adolescence into early adulthood after childhhod-diagnosed ADHD. Five hundred forty-seven children, mean age 8.5, diagnosed with DSM-IV combined-type ADHD and 258 classmates without ADHD (local normative comparison group; LNCG) completed the Substance Use (SU) Questionnaire up to eight times from mean age 10 to mean age 25. In adulthood, weekly marijuana use (32.8% ADHD vs. 21.3% LNCG) and daily cigarette smoking (35.9% vs. 17.5%) were more prevalent in the ADHD group than the LNCG. The cumulative record also revealed more early substance users in adolescence for ADHD (57.9%) than LNCG (41.9%), including younger first use of alcohol, cigarettes, marijuana, and illicit drugs. Alcohol and non-marijuana illicit drug use escalated slightly faster in the ADHD group in early adolescence. Early SU predicted quicker SU escalation and more SU in adulthood for both groups. Frequent SU for young adults with childhood ADHD is accompanied by greater initial exposure at a young age and slightly faster progression. Early SU prevention and screening is critical before escalation to intractable levels.

2018 D'Amico et al investigated changes in exposure to medical marijuana advertising and subsequent adolescent marijuana use. Abstract: We followed two cohorts of 7th and 8th graders (mean age 13) recruited from school districts in Southern California from 2010 until 2017 (mean age 19) to examine effects of MM advertising on adolescents' marijuana use, cognitions, and consequences over seven years. Latent growth models examined trajectories of self-reported exposure to medical marijuana ads in the past three months and trajectories of use, cognitions, and consequences. Higher average exposure to MM advertising was associated with higher average use, intentions to use, positive expectancies, and negative consequences. Similarly, higher rates of change in MM advertising exposure were associated with higher rates of change in use, intentions, expectancies, and consequences over seven years.

Results suggest that exposure to MM advertising may not only play a significant role in shaping attitudes about marijuana, but may also contribute to increased marijuana use and related negative consequences throughout adolescence. This highlights the importance of considering regulations for marijuana advertising, similar to regulations in place for the promotion of tobacco and alcohol in the U.S.

2018 Fairman et al discovered that more young people are choosing marijuana before cigarettes and alcohol. This is especially prevalent among young men of specific racial and ethnic groups in the US.Young people who start off on marijuana before alcohol or tobacco are more likely to become heavy users and have cannabis-related problems later in life.The research team analyzed nationally-representative, cross-sectional survey data available as part of the US National Survey on Drug Use and Health. This data draws on information from more than 275,500 individuals aged 12 to 21 and was collected between 2004 and 2014. Survey respondents were asked about their use of marijuana, cigarettes, alcohol, and other forms of tobacco or illegal drugs. Those who used these substances provided further information about which they started using first, and at what age.The researchers found that 8 per cent of participants reported in 2014 that marijuana was the first drug they ever used. This percentage had almost doubled from 4.8 per cent in 2004. According to Fairman, this could be related to a concurrent decline in those who start smoking cigarettes first, which dropped from about 21 per cent in 2004 to 9 per cent in 2014. They also observed a significant increase in youth abstaining from substance use altogether, which rose from 36 per cent to 46 per cent, and therefore, but said it is unclear the degree to which increases in those initiating marijuana first could be due to youth abstaining or delaying cigarettes. They also found that those using marijuana first, rather than alcohol or cigarettes, were more likely to be male, and Black, American Indian/Alaskan Native, multiracial, or Hispanic. The researchers established that youths who used marijuana first were more likely to become heavy users later in life, and to develop a cannabis use disorder.

2018 Hall et al said, 'It is premature to expand access to medicinal cannabis in hopes of solving the US Opioid crisis'. '*There is very weak evidence to support the claim that expanding access to medical cannabis will reduce opioid overdose deaths in the United States*'.

2018 Monitoring the Future study finds one in four of 12th graders admitting they would be more likely use marijuana if legalised. Overall, the rate of 12th graders saying they would not use marijuana if it were legalized fell 30% in the last ten years. Additionally, the rate of 12th graders who said they would use more marijuana if it were legal increased by almost 100% in the past decade. Interestingly, the survey also found that 17% of 12th graders today believe that their parents would not disapprove of marijuana use. This is almost double that of the 8% average from the late 1970s. the proportion of 12th graders who favour legalization of marijuana was at the highest level ever recorded, at 49%.

2018 Campbell et al investigated the effect of cannabis use in people with chronic non-cancer pain prescribed opioids –4 year prospective study. The Pain and Opioids IN Treatment study is a prospective, national, observational cohort of people with chronic non-cancer pain prescribed opioids. Participants were recruited through community pharmacies across Australia, completed baseline interviews, and were followed up with phone interviews or self-complete questionnaires yearly for 4 years. Recruitment took place from August 13, 2012, to April 8, 2014. Participants were asked about lifetime and past year chronic pain conditions, duration of chronic non-cancer pain, pain self-efficacy, whether pain was neuropathic, lifetime and past 12-month cannabis use, number of days cannabis was used in the past month, and current depression and generalised anxiety disorder. We also estimated daily oral morphine equivalent doses of opioids. We used logistic regression to investigate cross-sectional associations with frequency of cannabis use, and lagged mixed-effects models to examine temporal associations between cannabis use and outcomes. Findings 1514 participants completed the baseline interview and were included in the study from Aug 20, 2012, to April 14, 2014. Cannabis use was common, and by 4-year follow-up, 295 (24%) participants had used cannabis for pain. Interest in using cannabis for pain increased from 364 (33%) participants (at baseline) to 723 (60%) participants (at 4 years). At 4-year follow-up, compared with people with no cannabis use, we found that participants who used cannabis had a greater pain severity score (risk ratio 1·14, 95% CI 1·01–1·29, for less frequent cannabis use; and 1·17, 1·03–1·32, for daily or near-daily cannabis use), greater pain interference score (1·21, 1·09–1·35; and 1·14, 1·03–1·26), lower pain self-efficacy scores (0·97, 0·96–1·00; and 0·98, 0·96–1·00), and greater generalised anxiety disorder severity scores (1·07, 1·03–1·12; and 1·10, 1·06–1·15). We found no evidence of a temporal relationship between cannabis use and pain

severity or pain interference, and no evidence that cannabis use reduced prescribed opioid use or increased rates of opioid discontinuation. Interpretation Cannabis use was common in people with chronic non-cancer pain who had been prescribed opioids, but we found no evidence that cannabis use improved patient outcomes. People who used cannabis had greater pain and lower self-efficacy in managing pain, and there was no evidence that cannabis use reduced pain severity or interference or exerted an opioid-sparing effect. As cannabis use for medicinal purposes increases globally, it is important that large well designed clinical trials, which include people with complex comorbidities, are conducted to determine the efficacy of cannabis for chronic non-cancer pain.

2018 Christiansen and Bretteville-Jensen asked, 'Who seeks treatment for cannabis use? Abstract: There has been an absolute and relative increase in the number of patients with cannabis-related disorders as the principal diagnosis in many countries in recent years. Cannabis is now the most frequently mentioned problem drug reported by new patients in Europe, and cannabis patients constituted one third of all drug treatment patients in 2015. There is limited knowledge with regard to patient characteristics, the extent and types of health and psychosocial problems, as well as their association with long-term outcomes. Methods: We analysed indicators of physical, psychological and psychosocial problems of all patients admitted to treatment for cannabis use in Norway in 2009 and 2010 using register data and observed them to the end of 2013. Patient characteristics and outcomes were compared to a randomly drawn control group with corresponding age and gender distribution. Using logistic regression of prospective data, we studied associations between baseline characteristics and work and study status in 2013. Results: Cannabis patients tended to be relatively young and the large majority were male. They had parents who were less highly educated compared to controls, while there was no difference in migration background. In addition to an increased risk of premature death, nearly half of the patients received a secondary psychological diagnosis and a similar proportion received an additional substance use diagnosis during the 4–5 years of study follow-up. The cannabis patients were less educated than the control group and also less likely to be studying or working at the end of the study period. Entering treatment at a young age, having completed more than secondary education, having a highly-educated mother and not having a secondary diagnosis were factors that were positively associated with being in education or employment at the end of follow-up. Conclusions: Data covering the entire Norwegian population of patients admitted primarily for cannabis-related problems showed comprehensive and complex patterns of physical, psychological and psychosocial problems. The prevalence and extent of these problems varied markedly from those of the general population. Work and study outcomes following treatment depended on the seriousness of the condition including co-morbidity as well as social capital.

2018 Heizer et al looked at marijuana misadventures in children. Abstract: A retrospective review was performed on children aged 31 days to 20 years who presented to Children's Hospital Colorado for care related to acute THC toxicity. The children were divided into groups based on exposure: group 1 (THC naïve) and group 2 (THC non-naïve). A total of 38 children (age, 3.5 [3] years) met inclusion for group 1 and an equal number of children (age, 15.1 [3.9] years) met the criteria for comparison in group 2. Eight naïve patients had documentation of estimated THC dose ingested (mean [SD], 7.13 [5.8] mg/kg; range, 2.9-19.5 mg/kg). A direct relationship between estimated oral THC dose, level of medical intervention required, and hospital disposition was observed. Lethargy/somnolence was more common in the naïve group (84% vs. 26%, $P < 0.0001$) whereas problems in cognition, perception, and behavior were more common in the non-naïve group (4% vs 11%, $P = 0.01$). The duration of clinical effect and length of hospital stay were longer in the naïve group (19.3 vs 5.0 hours, $P < 0.0001$) and (0.73 vs 0.19 days, $P < 0.0001$) respectively. There seems to be a direct relationship between the estimated oral THC dose (mg/kg), hospital disposition, and level of medical intervention required. Symptoms and duration of effects after THC exposure varied based on the route of exposure, age of patient, and history of previous THC experience.

2018 Rioux et al looked at the age of cannabis use and adult drug abuse symptoms. The present study examined 1) whether the associations between cannabis use (CU) age of onset and drug abuse by 28 y remain when controlling for risk factors in childhood, adolescence and early adulthood; and 2) the developmental pathways from early risk factors to drug abuse problems. Participants from a longitudinal sample of boys of low socioeconomic status (N = 1,030) were followed from 6 to 28 y. We examined the self-reported CU onset between the ages of 13 and 17 y and drug abuse symptoms by 28 y. The odds of developing any drug abuse symptoms by 28 y were reduced by 31% for each year of delayed CU onset (OR = 0.69). Cannabis, alcohol and other drug frequency at 17 y mediated this association. Still, even when taking that frequency of use into account, adolescents who started using

cannabis before 15 y were at a higher risk of developing drug abuse symptoms by age 28 y. Significant indirect effects were found from early adolescent delinquency and affiliation with deviant friends to drug abuse symptoms at 28 y through CU age of onset and substance use frequency at 17 y. The results suggest more clearly than before that prevention programs should aim at delaying CU onset to prevent or reduce drug abuse in adulthood. Furthermore, prevention programs targeting delinquency and/or affiliation with deviant friends in childhood or early adolescence could indirectly reduce substance abuse in adulthood without addressing substance use specifically.

2018 Leos-Toro et al investigated perceived support fpor medical cannabis use among approved medical cannabis users in Canada. Abstract:Very little is known about the social experience of medical cannabis use, including the experience of stigma among approved users. The current study examined perceptions of support from physicians, family and friends as well as the prevalence of 'hiding' medicinal cannabis use.An online cross-sectional survey (N = 276) was conducted from 29 April to 8 June 2015. No public sampling frame was available from which to sample approved medical cannabis users (MCU). Eligible respondents were approved MCUs, aged 18 years or older, and reported cannabis use in the past 30 days for health reasons. Logistic regression analyses were used to assess aspects of stigma, including perceived support from their immediate social environment as well as behaviours reflecting a perceived social disapproval.Approximately one-third of respondents (32.6%) reported that their physician had refused to provide a medical document, and the vast majority of respondents (79.3%) reported hiding their medical cannabis use, most commonly to avoid judgement. Fewer than half of approved users perceived that their doctor was 'supportive' (38%), whereas two-thirds perceived support from family (66.3%) and friends (66.3%). Perceptions of support were similar across most socio-demographic sub-groups.Substantial proportions of approved MCUs in Canada report a lack of support and most have made some effort to conceal their medical cannabis use. Overall, the findings suggest that social norms around medical cannabis use remain unfavourable for many users, despite that fact that medical cannabis has been legal in Canada for more than a decade.

2018 Braun et al investigated medical oncologists' beliefs re medical marijuana. Abstract: Although almost every state medical marijuana (MM) law identifies cancer as a qualifying condition, little research supports MM's use in oncology. We hypothesized that the discrepancy between these laws and the scientific evidence base poses clinical challenges for oncologists. Oncologists' beliefs, knowledge, and practices regarding MM were examined in this study. Methods In November 2016, we mailed a survey on MM to a nationally-representative, random sample of 400 medical oncologists. Main outcome measures included whether oncologists reported discussing MM with patients, recommended MM clinically in the past year, or felt sufficiently informed to make such recommendations. The survey also queried oncologists' views on MM's comparative effectiveness for several conditions (including its use as an adjunct to standard pain management strategies) and its risks compared with prescription opioids. Bivariate and multivariate analyses were performed using standard statistical techniques. Results The overall response rate was 63%. Whereas only 30% of oncologists felt sufficiently informed to make recommendations regarding MM, 80% conducted discussions about MM with patients, and 46% recommended MM clinically. Sixty-seven percent viewed it as a helpful adjunct to standard pain management strategies, and 65% thought MM is equally or more effective than standard treatments for anorexia and cachexia. Conclusion Our findings identify a concerning discrepancy between oncologists' self-reported knowledge base and their beliefs and practices regarding MM. Although 70% of oncologists do not feel equipped to make clinical recommendations regarding MM, the vast majority conduct discussions with patients about MM and nearly one-half do, in fact, recommend it clinically. A majority believes MM is useful for certain indications. These findings are clinically important and suggest critical gaps in research, medical education, and policy regarding MM.

2018 Karanges et al examined the knowledge and attitudes of Australian general practitioners (GP) towards medicinal cannabis, including patient demand, GP perceptions of therapeutic effects and potential harms, perceived knowledge and willingness to prescribe. A cross-sectional survey completed by 640 GPs (response rate=37%) attending multiple-topic educational seminars in five major Australian cities between August and November 2017. Number of patients enquiring about medicinal cannabis, perceived knowledge of GPs, conditions where GPs perceived it to be beneficial, willingness to prescribe, preferred models of access, perceived adverse effects and safety relative to other prescription drugs. The majority of GPs (61.5%) reported one or more patient enquiries about medicinal cannabis in the last three months. Most felt that their own knowledge was inadequate and only 28.8% felt comfortable discussing medicinal cannabis with patients. Over half (56.5%) supported

availability on prescription, with the preferred access model involving trained GPs prescribing independently of specialists. Support for use of medicinal cannabis was condition-specific, with strong support for use in cancer pain, palliative care and epilepsy, and much lower support for use in depression and anxiety. The majority of GPs are supportive or neutral with regards to medicinal cannabis use. Our results highlight the need for improved training of GPs around medicinal cannabis, and the discrepancy between GP-preferred models of access and the current specialist-led models.

2018 Keyhani et al conducted a National Survey of US adults for their opinion of the risks and benefits of cannabis use. They used a probability-based online survey in the US 2017. 16,280 US adults were involved. They looked at the proportion of U.S. adults who agreed with a statement. The response rate was 55.3% (n = 9003). Approximately 14.6% of U.S. adults reported using marijuana in the past year. About 81% of U.S. adults believe marijuana has at least 1 benefit, whereas 17% believe it has no benefit. The most common benefit cited was pain management (66%), followed by treatment of diseases, such as epilepsy and multiple sclerosis (48%), and relief from anxiety, stress, and depression (47%). About 91% of U.S. adults believe marijuana has at least 1 risk, whereas 9% believe it has no risks. The most common risk identified by the public was legal problems (51.8%), followed by addiction (50%) and impaired memory (42%). Among U.S. adults, 29.2% agree that smoking marijuana prevents health problems. About 18% believe exposure to secondhand marijuana smoke is somewhat or completely safe for adults, whereas 7.6% indicated that it is somewhat or completely safe for children. Of the respondents, 7.3% agree that marijuana use is somewhat or completely safe during pregnancy. About 22.4% of U.S. adults believe that marijuana is not at all addictive. Wording of the questions may have affected interpretation. They concluded that Americans' view of marijuana use is more favorable than existing evidence supports.

2018 Moreno et al looked at marijuana promotions on social media and adolescents views on prevention strategies. Youth exposure to positive marijuana messages increases their risk of marijuana use. Since Washington State legalized recreational marijuana in 2012, marijuana businesses have used social media business pages to promote their products. Regulations to prevent youth access and targeting by marijuana businesses on social media in Washington State are absent. The purpose of this study was to engage youth in conceptualizing prevention approaches to limit youth exposure to marijuana business promotions on social media. Towards our goal of generating novel prevention approaches and promoting youth interaction to build ideas, we used focus groups. Adolescents ages 15-20 years in Washington State were recruited through purposeful sampling to achieve a diverse sample from six schools across two counties. During focus groups, trained facilitators used a semi-structured guide to prompt discussion about marijuana business presence on social media. In the latter half of focus groups, facilitators showed example social media posts from marijuana businesses. All focus groups were audio recorded and manually transcribed. Qualitative analysis was conducted using the constant comparative method.A total of 32 adolescents with average age 17 years (SD = 0.6), 71% female, 43.8% Asian and 21.9% mixed race, participated in 5 focus groups. Recommendations for prevention focused in two main thematic areas. First, participants supported policies to restrict underage access to marijuana social media pages, an example quote was: "you have access to [the social media page] without being 21 and I think that's a problem." Second, participants proposed regulation of content that marijuana companies can post on social media, an example quote was: "I'm thinking they shouldn't be allowed to use children or anything associated with children and the memes that they post."Our findings indicate two strategies to limit youth exposure to marijuana content on social media. These specific strategies represent potential avenues to revise state policies and test the effectiveness of these approaches for states that permit recreational marijuana.

2018 Dupont et al looked at drug use among youth. National survey data support a common liability of all drug use. Abstract: The prevalence of substance use disorders in adults is higher if substance use is initiated during adolescence, underscoring the importance of youth substance use prevention. We examined whether the use of one substance by adolescents is associated with increased risk for using any other substance, regardless of use sequences. In 2017 we examined data from 17,000 youth aged 12-17 who participated in the 2014 National Survey on Drug Use and Health, a sample of nationally representative data on substance use among the U.S. civilian, noninstitutionalized population aged 12 or older. Descriptive analyses and multivariable logistic regression models were applied. After controlling for age, sex, and race/ethnicity, compared with youth without past-month marijuana use, youth with past-month marijuana use were 8.9 times more likely to report past-month cigarette use, 5.6, 7.9 and 15.8 times more likely to report past-month alcohol use, binge use, or heavy use (respectively), and 9.9 times more likely to report past-month use of other illicit drugs. The prevalence

of past-month use of cigarettes, marijuana, and other illicit drugs was significantly higher among past-month alcohol users compared with youth without past-month alcohol use, and increased as intensity of alcohol use rose. Among past-month cigarette smokers, the prevalence of marijuana, other illicit drugs, and alcohol use were each significantly higher than youth without past-month cigarette use. Youth marijuana use, cigarette smoking, or alcohol consumption is associated with other substance use. This finding has importance for youth prevention, supporting a message no use by youth of any substance.

2018 Audrain-McGovern et al looked at adolescent e-cigarette, hookah, and conventional cigarette use and subsequent marijuana use. Abstract: Noncigarette tobacco products may confer a risk of marijuana use similar to combustible cigarettes. We examined whether adolescent electronic cigarette (e-cigarette), hookah, or combustible cigarette use is associated with initiating and currently using marijuana as well as using both tobacco and marijuana concurrently. Adolescents from 10 public schools in Los Angeles, California, completed in-classroom surveys at baseline (fall 2013, ninth grade) and at a 24-month follow-up (fall 2015, 11th grade). Among adolescents who never used marijuana at baseline (N = 2668), associations of baseline e-cigarette, hookah, or combustible cigarette use with ever marijuana use (initiation), current marijuana use (past 30 days), and current dual use of marijuana and these tobacco products at the 24-month follow-up were examined. Baseline ever versus never e-cigarette use was associated with initiation (odds ratio [OR] 3.63; 95% confidence interval [CI] 2.69‐4.90) and current (OR 3.67; 95% CI 2.51‐5.36) marijuana use 24 months later. Ever versus never hookah use was associated with initiation (OR 3.55; 95% CI 2.49‐5.08) and current (OR 4.10; 95% CI 2.69‐6.25) marijuana use 24 months later. Similar associations were observed for combustible cigarette smoking and initiation (OR 4.30; 95% CI 2.79‐6.63) and current use of marijuana (OR 1.97; 95% CI 1.05‐3.68). Current use of any of these tobacco products at baseline was associated with current use of both tobacco and marijuana (OR 2.28; 95% CI 1.47‐3.55) 24 months later. The association between tobacco use and subsequent marijuana use across adolescence extends to multiple tobacco products.

2018 Colizzi et al produced a longitudinal assessment of the effect of cannabis use on hospital re-admission rates in early psychosis. Abstract: Cannabis is the most commonly used illicit drug in psychosis patients and has been identified as a risk factor for relapse and subsequent hospital readmission, having substantial economic implications. To clarify the contribution of cannabis consumption to hospital readmission, a consecutive inpatient cohort of 161 early psychosis patients was included into the study. Data on cannabis use at admission and number of hospital readmissions and length of stay (LOS, number of inpatient days) in a 6-year follow-up was extracted from clinical notes. 62.4% of the patients had lifetime cannabis use. Their admission lasted on average 54.3 ± 75 days and over the following 6 years patients had 2.2 ± 2.8 hospital readmissions, for a total of 197.4 ± 331.5 days. Cannabis use significantly predicted the number of hospital readmissions and LOS in the following 6 years, the latter remaining significant after adjusting for use of other substance. Cannabis-using patients of male gender and Black ethnicity had a longer LOS at follow-up compared to female patients and other ethnic groups, respectively. Having a history of cannabis use when admitted to an early intervention inpatient unit for psychosis is associated with a higher number of subsequent hospital readmissions and a longer LOS, especially in male and Black patients.

2018 Stockings et al investigated cannabis and cannabinoids for the treatment of people with chronic noncancer pain conditions. Abstract: This review examines evidence for the effectiveness of cannabinoids in chronic noncancer pain (CNCP) and addresses gaps in the literature by: considering differences in outcomes based on cannabinoid type and specific CNCP condition; including all study designs; and following IMMPACT guidelines. MEDLINE, Embase, PsycINFO, CENTRAL, and clinicaltrials.gov were searched in July 2017. Analyses were conducted using Revman 5.3 and Stata 15.0. A total of 91 publications containing 104 studies were eligible (n = 9958 participants), including 47 randomised controlled trials (RCTs) and 57 observational studies. Forty-eight studies examined neuropathic pain, 7 studies examined fibromyalgia, 1 rheumatoid arthritis, and 48 other CNCP (13 multiple sclerosis-related pain, 6 visceral pain, and 29 samples with mixed or undefined CNCP). Across RCTs, pooled event rates (PERs) for 30% reduction in pain were 29.0% (cannabinoids) vs 25.9% (placebo); significant effect for cannabinoids was found; number needed to treat to benefit was 24 (95% confidence interval [CI] 15-61); for 50% reduction in pain, PERs were 18.2% vs 14.4%; no significant difference was observed. Pooled change in pain intensity (standardised mean difference: -0.14, 95% CI -0.20 to -0.08) was equivalent to a 3 mm reduction on a 100 mm visual analogue scale greater than placebo groups. In RCTs, PERs for all-cause adverse events were 81.2% vs 66.2%; number needed to treat to harm: 6 (95% CI 5-8). There were no significant impacts on physical or

emotional functioning, and low-quality evidence of improved sleep and patient global impression of change. Evidence for effectiveness of cannabinoids in CNCP is limited. Effects suggest that number needed to treat to benefit is high, and number needed to treat to harm is low, with limited impact on other domains. It seems unlikely that cannabinoids are highly effective medicines for CNCP.

2018 Marel et al looked at the progression from first use to use disorder on alcohol, cannabis, stimulants etc. Abstract: Relatively little is known about factors that may lead to the development of a substance use disorder (SUD), across a range of drug classes. This study aimed to identify factors that predict the likelihood of transition from use to SUD and the speed with which this may occur at the population level, with a focus on the impact of pre-existing mental disorders. Data were collected as part of the 2007 Australian National Survey of Mental Health and Wellbeing, a nationally representative survey of 8841 Australian adults. A series of discrete time survival analyses were undertaken on data pertaining to the age of onset of use and symptoms of use disorder, for alcohol, cannabis, sedatives, stimulants, and opioids, as well as the impact of pre-existing mood and anxiety disorders on the likelihood of developing a SUD. Lifetime cumulative probability estimates indicated that 50.4% of stimulant, 46.6% of opioid, 39% of sedative, 37.5% of alcohol, and 34.1% of cannabis users would develop a SUD on those substances, within an estimated 14, 12, 8, 30, and 23 years after onset respectively. Pre-existing mental disorders were significantly associated with increased risk of developing a SUD for alcohol, cannabis and stimulant use disorder. The relative speed associated with the transition from use to SUD emphasizes the narrow window of time available to intervene, underscoring the urgency of early identification of mental health conditions and the timely provision of appropriate evidence-based interventions, which could potentially prevent the development of secondary SUDs.

2018 Bleyer et al investigated the opioid death rate acceleration in jurisdictions legalising marijuana use. Two reports published in a recent issue of *JAMA Internal Medicine* describe 6% to 9% lower opioid prescribing rates for Medicare and Medicaid patients in states that legalized marijuana compared with states that have not. As cautioned in the accompanying editorial, however, “cannabis policy has raced ahead of cannabis science,” and more research is necessary to determine if marijuana availability ameliorates opioid mortality (marijuana-protection hypothesis).

2018 Akturk et al looked at an association between cannabis use and risk for diabetic ketoacidosis in adults with type 1 diabetes. Abstract:*While some evidence suggests that cannabis use may improve insulin sensitivity and pancreatic function in patients with type 1 diabetes, there also have been reports that it may be linked to diabetic ketoacidosis (DKA).* While some evidence suggests that cannabis use may improve insulin sensitivity and pancreatic function in patients with type 1 diabetes, there also have been reports that it may be linked to diabetic ketoacidosis (DKA). To investigate this possible association, researchers with the University of Colorado Anschutz Medical Campus and the Mayo Clinic queried 450 adults with type 1 diabetes about their demographic traits, diabetes history and complications, severe hypoglycemia requiring assistance, and cannabis use. Nearly 30%, or 134 patients, said they had used cannabis. A relationship was observed between cannabis use during the prior year and elevated DKA risk compared with nonusers, which investigators suspect may be explained by the fact that cannabinoids alter gut motility and cause hyperemesis. Hemoglobin A1c levels also trended higher among cannabis users, but severe hypoglycemia was comparable between the two sets of patients. Because of the study's small scale, self-reported data, and other limitations, further research is needed to confirm the findings. 2018 Han et al looked at marijuana use by middle-age and older adults in the United States 2015-2016. Abstract: Marijuana use is increasing among middle-aged and older adults in the US, but little is understood of its pattern of use by this population. We performed a cross-sectional analysis of responses from 17,608 adults aged ≥50 years from the 2015 and 2016 administrations of the National Survey on Drug Use and Health. Prevalence of past-year marijuana use was estimated and compared between middle-aged adults (age 50–64) and older adults (≥65). Characteristics of past-year marijuana users including demographics, substance use, chronic disease, and emergency room use, were compared to non-marijuana users and stratified by age group. Marijuana use characteristics were also compared between middle-aged and older adults. We used multivariable logistic regression to determine correlates of past-year marijuana use. Prevalence of past-year marijuana use was 9.0% among adults aged 50–64 and 2.9% among adults aged ≥65. Prevalence of past-year alcohol use disorder (AUD), nicotine dependence, cocaine use, and misuse of prescription medications (i.e., opioids, sedatives, tranquilizers) were higher among marijuana users compared to non-users. In adjusted models, initiation of marijuana use <19 years of age [adjusted odds ratio (AOR) = 13.43, 95% confidence interval (CI) 9.60, 18.78)], AUD (AOR = 2.11, 95% CI 1.51, 2.94), prescription opioid misuse (AOR 2.49, 95% CI 1.61, 3.85), nicotine dependence (AOR = 1.90, 95% CI

1.59, 2.26), and cocaine use (AOR 7.43, 95% CI 4.23, 13.03), were all associated with increased odds of past-year marijuana use.Marijuana use is becoming more prevalent in this population and users are also at high risk for other drug use.

2018 Russo et al investigated low doses of widely consumed cannabinoids (cannabidiol and cannabidivarin) and found that they cause DNA damage and chromosomal aberrations in human-derived cells. Abstract: Cannabidiol (CBD) and cannabidivarin (CBDV) are natural cannabinoids which are consumed in increasing amounts worldwide in cannabis extracts, as they prevent epilepsy, anxiety, and seizures. It was claimed that they may be useful in cancer therapy and have anti-inflammatory properties. Adverse long-term effects of these drugs (induction of cancer and infertility) which are related to damage of the genetic material have not been investigated. Therefore, we studied their DNA-damaging properties in human-derived cell lines under conditions which reflect the exposure of consumers. Both compounds induced DNA damage in single cell gel electrophoresis (SCGE) experiments in a human liver cell line (HepG2) and in buccal-derived cells (TR146) at low levels (≥ 0.2 µM). Results of micronucleus (MN) cytome assays showed that the damage leads to formation of MNi which reflect chromosomal aberrations and leads to nuclear buds and bridges which are a consequence of gene amplifications and dicentric chromosomes. Additional experiments indicate that these effects are caused by oxidative base damage and that liver enzymes (S9) increase the genotoxic activity of both compounds. Our findings show that low concentrations of CBD and CBDV cause damage of the genetic material in human-derived cells. Furthermore, earlier studies showed that they cause chromosomal aberrations and MN in bone marrow of mice. Fixation of damage of the DNA in the form of chromosomal damage is generally considered to be essential in the multistep process of malignancy, therefore the currently available data are indicative for potential carcinogenic properties of the cannabinoids.

2018 Spindle et al compared the acute effects of smoked and vaporized cannabis in healthy adults who infrequently use cannabis. Abstract: Vaporization is an increasingly popular method for cannabis administration, and policy changes have increased adult access to cannabis drastically. Controlled examinations of cannabis vaporization among adults with infrequent current cannabis use patterns (>30 days since last use) are needed. The aim was to evaluate the acute dose effects of smoked This within-participant, double-blind, crossover study was conducted from June 2016 to January 2017 at the Behavioral Pharmacology Research Unit, Johns Hopkins University School of Medicine, and included 17 healthy adults. Six smoked and vaporized outpatient experimental sessions (1-week washout between sessions) were completed in clusters (order counterbalanced across participants); dose order was randomized within each cluster. Cannabis containing Δ9-tetrahydrocannabinol (THC) doses of 0 mg, 10 mg, and 25 mg was vaporized and smoked by each participant. They looked for change from baseline scores for subjective drug effects, cognitive and psychomotor performance, vital signs, and blood THC concentration. Results The sample included 17 healthy adults (mean [SD] age, 27.3 [5.7] years; 9 men and 8 women) with no cannabis use in the prior month (mean [SD] days since last cannabis use, 398 [437] days). Inhalation of cannabis containing 10 mg of THC produced discriminative drug effects (mean [SD] ratings on a 100-point visual analog scale, smoked: 46 [26]; vaporized: 69 [26]) and modest impairment of cognitive functioning. The 25-mg dose produced significant drug effects (mean [SD] ratings, smoked: 66 [29]; vaporized: 78 [24]), increased incidence of adverse effects, and pronounced impairment of cognitive and psychomotor ability (eg, significant decreased task performance compared with placebo in vaporized conditions). Vaporized cannabis resulted in qualitatively stronger drug effects for most pharmacodynamic outcomes and higher peak concentrations of THC in blood, compared with equal doses of smoked cannabis (25-mg dose: smoked, 10.2 ng/mL; vaporized, 14.4 ng/mL). Blood THC concentrations and heart rate peaked within 30 minutes after cannabis administration and returned to baseline within 3 to 4 hours. Several subjective drug effects and observed cognitive and psychomotor impairments persisted for up to 6 hours on average. They concluded that vaporized and smoked cannabis produced dose-orderly drug effects, which were stronger when vaporized. These data can inform regulatory and clinical decisions surrounding the use of cannabis among adults with little or no prior cannabis exposure.

2018 Tan et al investigated whether boys with social difficulties were more susceptible to early substance use. They concluded that boys who enter sixth-grade with co-occurring social skills, anxiety, learning and conduct problems are at the greatest risk of developing aggressive behavior and using tobacco, alcohol and marijuana by the end of eighth grade, a new study found.

2018 Wang et al investigated the impact of marijuana legalisation in Colorado on adolescent emergency and urgent care visits. Abstract: Approximately 6%-8% of U.S. adolescents are daily/past-month users of marijuana. However, survey data may not reliably reflect the impact of legalization on

adolescents. The objective was to evaluate the impact of marijuana legalization on adolescent emergency department and urgent cares visits to a children's hospital in Colorado, a state that has allowed both medical and recreational marijuana. Retrospective review of marijuana-related visits by International Classification of Diseases codes and urine drug screens, from 2005 through 2015, for patients ≥ 13 and < 21 years old. From 2005 to 2015, 4,202 marijuana-related visits were identified. Behavioral health evaluation was obtained for 2,813 (67%); a psychiatric diagnosis was made for the majority (71%) of these visits. Coingestants were common; the most common was ethanol (12%). Marijuana-related visits increased from 1.8 per 1,000 visits in 2009 to 4.9 in 2015. (p = < .0001) Despite national survey data suggesting no appreciable difference in adolescent marijuana use, our data demonstrate a significant increase in adolescent marijuana-associated emergency department and urgent cares visits in Colorado.

2018 Habboushe et al investigated the prevelance of cannabinoid hyperemesis syndrome among regular marijuana smokers in an urban public hospital. Abstract: Epidemiological data, including prevalence, for cannabinoid hyperemesis syndrome (CHS) remain largely unknown. Without these data, clinicians often describe CHS as 'rare' or 'very rare' without supporting evidence. We seek to estimate the prevalence of CHS in a population of patients presenting to a socio-economically and racially diverse urban Emergency Department of a public hospital. This study consisted of a questionnaire administered to a convenience sample of patients presenting to the ED of the oldest public hospital in the United States. Trained Research Associates (RAs) administered the questionnaire to patients between the ages of 18-49 years who reported smoking marijuana at least 20 days per month. The survey included questions related to CHS symptoms (nausea and vomiting) and Likert scale rankings on eleven symptom relief methods, including 'hot showers'. Patients were classified as experiencing a phenomenon consistent with CHS if they reported smoking marijuana at least 20 days per month and also rated 'hot showers' as five or more on the ten-point symptom relief method Likert scale for nausea and vomiting. Among 2127 patients approached for participation, 155 met inclusion criteria as smoking 20 or more days per month. Among those surveyed, 32.9% (95% CI, 25.5-40.3%) met our criteria for having experienced CHS. If this is extractable to the general population, approximately 2.75 million (2.13-3.38 million) Americans may suffer annually from a phenomenon similar to CHS.

2018 Szaflarski et al investigated long-term safety and treatment effects of cannabidiol in children and adults with treatment-resistant epilepsies. ABSTRACT:Since 2014, cannabidiol (CBD) has been administered to patients with treatment-resistant epilepsies (TREs) in an ongoing expanded-access program (EAP). We report interim results on the safety and efficacy of CBD in EAP patients treated through December 2016. METHODS:Twenty-five US-based EAP sites enrolling patients with TRE taking stable doses of antiepileptic drugs (AEDs) at baseline were included. During the 4-week baseline period, parents/caregivers kept diaries of all countable seizure types. Patients received oral CBD starting at 2-10 mg/kg/d, titrated to a maximum dose of 25-50 mg/kg/d. Patient visits were every 2-4 weeks through 16 weeks and every 2-12 weeks thereafter. Efficacy endpoints included the percentage change from baseline in median monthly convulsive and total seizure frequency, and percentage of patients with ≥50%, ≥75%, and 100% reductions in seizures vs baseline. Data were analyzed descriptively for the efficacy analysis set and using the last-observation-carried-forward method to account for missing data. Adverse events (AEs) were documented at each visit.RESULTS:Of 607 patients in the safety dataset, 146 (24%) withdrew; the most common reasons were lack of efficacy (89 [15%]) and AEs (32 [5%]). Mean age was 13 years (range, 0.4-62). Median number of concomitant AEDs was 3 (range, 0-10). Median CBD dose was 25 mg/kg/d; median treatment duration was 48 weeks. Add-on CBD reduced median monthly convulsive seizures by 51% and total seizures by 48% at 12 weeks; reductions were similar through 96 weeks. Proportion of patients with ≥50%, ≥75%, and 100% reductions in convulsive seizures were 52%, 31%, and 11%, respectively, at 12 weeks, with similar rates through 96 weeks. CBD was generally well tolerated; most common AEs were diarrhea (29%) and somnolence (22%).SIGNIFICANCE:Results from this ongoing EAP support previous observational and clinical trial data showing that add-on CBD may be an efficacious long-term treatment option for TRE.

2018. Finn explains why marijuana will not fix the opioid epidemic. There is sufficient and expanding evidence demonstrating that medical marijuana use will not curb the opioid epidemic. There is further evidence that marijuana is a companion drug rather than substitution drug and that marijuana use may be contributing to the opioid epidemic rather than improving it. Although there are patients who have successfully weaned off of their opioids and use marijuana instead, the evidence that marijuana will replace opioids is simply not there. Medical provider and patient awareness, utilization of prescription drug monitoring programs, widespread availability and use of naloxone, and increasing coverage for atypical

opioids and abuse deterrent formulations are only some of the other factors which hopefully be contributing to any impact on the opioid crisis. Education and prevention efforts as well as medication assisted therapies will be additional benefits to impact the opioid epidemic. Physicians should continue to monitor their patients closely, perform random drug testing to detect opioid misuse or aberrant behavior, and intervene early with alternative therapies when possible. Marijuana alone is certainly not the answer.

2018 Reece and Hulse investigated the Impacts of cannabinoid epigenetics on human development: reflections on Murphy et. al. 'cannabinoid exposure and altered DNA methylation in rat and human sperm' epigenetics 2018; 13: 1208-1221. Abstract: Recent data from the Kollins lab ('Cannabinoid exposure and altered DNA methylation in rat and human sperm' Epigenetics 2018; 13: 1208–1221) indicated epigenetic effects of cannabis use on sperm in man parallel those in rats and showed substantial shifts in both hypo- and hyper-DNA methylation with the latter predominating. This provides one likely mechanism for the transgenerational transmission of epigenomic instability with sperm as the vector. It therefore contributes important pathophysiological insights into the probable mechanisms underlying the epidemiology of prenatal cannabis exposure potentially explaining diverse features of cannabis-related teratology including effects on the neuraxis, cardiovasculature, immune stimulation, secondary genomic instability and carcinogenesis related to both adult and pediatric cancers. The potentially inheritable and therefore multigenerational nature of these defects needs to be carefully considered in the light of recent teratological and neurobehavioural trends in diverse jurisdictions such as the USA nationally, Hawaii, Colorado, Canada, France and Australia, particularly relating to mental retardation, age-related morbidity and oncogenesis including inheritable cancerogenesis. Increasing demonstrations that the epigenome can respond directly and in real time and retain memories of environmental exposures of many kinds implies that the genome-epigenome is much more sensitive to environmental toxicants than has been generally realized. Issues of long-term multigenerational inheritance amplify these concerns. Further research particularly on the epigenomic toxicology of many cannabinoids is also required

2019 Keyes et al found that teens are increasingly choosing pot over alcohol, cigarettes etc.Abstract: In the past decade, marijuana use prevalence among adolescents has remained relatively steady while cigarette and alcohol prevalence has declined. We examined historical trends in: average grade of onset of marijuana, alcohol, and cigarette use by 12th grade; proportion who try alcohol/cigarettes before first marijuana use, among those who use by 12th grade; and conditional probability of marijuana use by 12th grade after trying alcohol/cigarettes.Data were drawn from 40 yearly, cross-sectional surveys of 12th grade US adolescents. A subset of students ($N = 246{,}050$) were asked when they first used each substance. We reconstructed cohorts of substance use from grade-of-onset to determine sequence of drug use, as well as probability of marijuana use in the same or later grade. Average grade of first alcohol and cigarette use by 12th grade increased across time; e.g., first cigarette increased from grade 7.9 in 1986 to 9.0 by 2016 ($\beta=0.04$, $SE = 0.001$, $p < 0.01$). The proportion of 12th grade adolescents who smoke cigarettes before marijuana fell below 50% in 2006. Each one-year increase was associated with 1.11 times increased odds of first cigarette in a grade after first marijuana (95% C.I. 1.11–1.12). Among those who initiate alcohol/cigarettes prior to marijuana by 12th grade, the probability of subsequent marijuana use is increasing. Marijuana is increasingly the first substance in the sequence of adolescent drug use. Reducing adolescent smoking has been a remarkable achievement of the past 20 years; those who continue to smoke are at higher risk for progression to marijuana use.2019 Freeman et al looked at the increasing potency and price of cannabis in Europe 2006-2016. Abstract: Data was collected from 28 EU member states, Norway and Turkey by the European Monitoring Centre for Drugs and Drug Addiction. Outcome variables were potency, price, and value for cannabis resin and herbal cannabis in Europe, 2006-2016. Inflation was estimated using the Harmonised Indices of Consumer Prices. Mixed effects linear regression models were used to estimate linear and quadratic time trends, with a random intercept and slope fitted to account for variation across countries. Resin potency increased from a mean (95% CI) of 8.14% THC (6.89, 9.49) in 2006 to 17.22 (15.23, 19.25) in 2016. Resin price increased from 8.21 Euros/gram (7.54, 8.97) to 12.27 (10.62, 14.16). Resin increased in value, from 11.00 mg THC per Euro (8.60, 13.62) to 16.39 (13.68, 19.05). Quadratic time trends for resin potency and value indicated minimal change from 2006-2011, followed by marked increases from 2011-2016. Herbal cannabis potency increased from 5.00% THC (3.91, 6.23) to 10.22 (9.01, 11.47). Herbal price increased from 7.36 Euros/gram (6.22, 8.53) to 12.22 (10.59, 14.03). The value of herbal cannabis did not change from 12.65 mg of THC (10.18, 15.34) to 12.72 (10.73, 14.73). All price trends persisted after adjusting for inflation. European cannabis resin and herbal cannabis increased in potency and price from 2006-2016. Cannabis resin (but not herbal cannabis) increased in the quantity of Δ9 -tetrahydrocannabinol per Euro spent. Marked increases in resin potency and value from 2011-2016 are consistent with the emergence of new resin production techniques in European and neighbouring drug markets'.

2019 CBD High Street CBD 'cannabis' oil to be banned for up to 18 months as experts probe whether it has any real health benefits Jan 30th 2019

The CDB oil is derived from cannabis but does not contain 'active' THC drug
The oil is promoted as a cure for anxiety, insomnia and joint and muscle pain
The Food Standards Agency says it counts as a 'novel food' and needs approval
So Trading Standards will be instructed to pull items from shops for 18 months

2019 Gauvin et al looked at marijuana toxicity due to heavy metal toxicity. Abstract: Federally unregulated, Marijuana Growth Organizations (MGOs) have now provided a path to exposures to the neurotoxicity of heavy metals. The lack of US Food and Drug Administration (FDA) and US Environmental Protection Agency (EPA) testing and oversight of the MGOs now threatens the public health. Agribusiness and botany experts proclaim the value of cannabis as a perfect rotating plant for phytoremediation programs to help scavenge heavy metals from soils prior to seeding the land for food product. Cannabis has a high affinity for soil contaminants without affecting its own heartiness. However, "legal" marijuana plots have burgeoned in the "Emerald Triangle" of Northern California, Oregon and Washington. According to the FDA's toxicology program, the largest sources of heavy metals (HMs) are the environments surrounding abandoned or active mines. The history of gold, platinum, coal, and copper mining in these grow areas now threatens the end-user; the plants ability to "scrub the earth" of these highly toxic HMs provides main stream smoke contamination to the consumer. Published reports of cannabis users showing hearing loss and neurological changes to temporal lobe structures involved in audition as well as learning and memory. The apoptotic cascade of cytotoxic events initiated by heavy metals is linked to the progression of Alzheimer's and Parkinson's disease, as well as hearing loss related to brain stem and temporal lobe neurotoxicity.2019 Stone et al looked at a case of pulmonary mucomycosis associated with medical marijuana use. Abstract: A 66-year-old man with diabetes presented to the hospital with a two-month history of dyspnea, cough, rust-colored sputum, night sweats and 20 pound weight loss. He had begun smoking medical marijuana 3 months earlier. CT of the chest showed multiple bilateral large ground glass opacities with surrounding consolidation. Infectious workup was negative. BAL was non-diagnostic. He was treated with broad spectrum antibiotics without improvement. VATS was performed and cultured lung tissue grew Rhizopus species. He was started on intravenous liposomal amphotericin B and micafungin and then transitioned to oral posaconazole after two weeks. Repeat CT two months later showed stable size of the cavities. One month later he died of massive pulmonary hemorrhage. Here we document what we believe is the first known case of pulmonary mucormycosis associated with medical marijuana use.

2019 Posis et al looked at indoor cannabis smoke and children's health. Abstract:Cannabis use is increasing and cannabis is typically consumed by smoking. This study explored how indoor secondhand cannabis smoke (SCS) was associated with child health. As part of a larger trial, air particle monitors were placed in 298 homes of families with at least one cigarette smoker and one child under 14 years old in San Diego County, California. Assessment included past 7-day indoor cigarette and cannabis use, the youngest child's exposure to cigarette smoke, and 5 smoke-related past-year child health outcomes: emergency department use for coughing/difficulty breathing; physician diagnosis of ear infection, bronchitis/bronchiolitis, asthma, or eczema/atopic dermatitis. An ordinal measure of adverse health outcomes (0, 1, or ≥2) was regressed on reported indoor cannabis smoking—the main measure of exposure (yes/no). Of 221 parents/guardians asked about cannabis use, 192 (86.9%) provided all required data, and 29 (15.1%) reported indoor cannabis smoking; reports were supported by air particle data. Homes without indoor smoking had lower average 7-day particle concentrations (1987 particles/0.01ft3) than homes with cannabis smoking only (3111 particles/0.01ft3), cigarette smoking only (3163 particles/0.01ft3), or both cigarette and cannabis smoking (5619 particles/0.01ft3). Odds of reporting a greater number of adverse health outcomes were 1.83 (95% CI = 0.89–3.80, $p = 0.10$) times higher for children of families with indoor cannabis smoking vs families without cannabis smoking, after controlling for exposure to cigarette smoke and other covariates. Our results do not indicate a statistically significant association. However, the magnitude of the (non-significant) association between indoor cannabis smoking and adverse health outcomes warrants more studies.

2019 Lewis et al looked at the engagement with medical cannabis information from online and mass media sources: is it related to medical cannabis attitudes and support for legaliation? Abstract:This study uses data from an online survey of Israeli adults (N = 554) to test the association between information seeking and scanning about medical cannabis (from mass media and online sources) and attitudes toward medical cannabis. Furthermore, we test indirect effects of media engagement on attitudes toward cannabis legalization through medical cannabis attitudes. Seeking and scanning for information about medical cannabis from online sources, but not from mass media sources, were associated with positive attitudes

toward medical cannabis. Engagement with medical cannabis information from online sources was also indirectly associated with greater support for cannabis legalization, through positive attitudes related to medical cannabis. The results suggest that one mechanism through which medical cannabis legalization is associated with cannabis legalization for all purposes is public engagement with information about medical cannabis in the media, particularly from the internet and social media channels. As increasingly more jurisdictions are expected to legalize medical cannabis, with resulting increase in media attention, support for recreational cannabis legalization may be expected to grow.

2019 Thomas et al looked at unintentional pediatric marijuana exposure prior to and after legalisation and commercial availability of recreational marijuana in Washington State. Abstract: Data were obtained from the WAPC database, toxiCALL®. Patients ≤ 9 years old with a reported marijuana exposure between July 2010 and July 2016 were included in the analysis. Patient and exposure characteristics were summarized and median exposure frequencies were calculated for the periods prior to and after legalization.There were 161 cases meeting the inclusion criteria that occurred between July 2010 and July 2016. Of these, 130 (81%) occurred in the 2.5-year period after legalization of recreational marijuana in January 2013. The median age of exposed children was 2 years (range 0–9 years). Eighty-one percent of the exposures occurred in the child's own home. The number of exposures per month increased after recreational marijuana was legalized in November 2012, and increased further once recreational marijuana shops were legally allowed to open in July 2014.Reported unintentional pediatric marijuana exposure has increased in the state of Washington since recreational marijuana was legalized. As marijuana becomes more available, clinicians should be aware of the risk of unintentional pediatric marijuana exposure, and this should inform lawmakers regarding regulations around childhood exposure to marijuana.

2019 Arterberry et al looked at higher average potency across the United Staea to find out if it is associated with progression to first cannabis use disorder symptom. Abstract: Data sources were the Michigan Longitudinal Study, an ongoing prospective, high-risk family study investigating the course and predictors for substance use disorders among youth beginning prior to school entry and time-parallel national average trends in delta-9-tetrahydrocannabinol (i.e., psychoactive compound in cannabis). The national average trends in delta-9-tetrahydrocannabinol were used to estimate potency level for the individual. Only cannabis users were included in analyses (n = 527). Cox regression showed an increased risk of progression from cannabis initiation to cannabis use disorder symptom onset by 1.41 times ($p < .001$) for each unit increase in national average delta-9-tetrahydrocannabinol as compared to those not endorsing CUD symptom onset, adjusting for sex, regular use, and cohort effects. Accounting for regular use, individuals initiating cannabis at national average 4.9% delta-9-tetrahydrocannabinol were at 1.88 times ($p = .012$) higher risk for cannabis use disorder symptom onset within one year compared to those who did not endorse CUD symptom onset, while those initiating cannabis at national average 12.3% delta-9-tetrahydrocannabinol were at 4.85 times ($p = .012$) higher risk within one year. This study provides prospective evidence suggesting higher potency cannabis, on average in the U.S., increases risk for onset of first cannabis use disorder symptom. Development of guidelines regarding cannabis potency is critical for reducing the costs associated with negative health outcomes.

2019 Donovan et al looked for a relationship between cannabis use and patient-supported symptoms in cancer patients seeking supportive palliative care. Abstract: We conducted a retrospective review of objectively measured tetrahydrocannabinol (THC) and subjectively reported cannabis use, its demographic and clinical correlates, and patient-reported symptoms in 816 cancer patients in active treatment referred to a supportive/palliative care outpatient clinic for specialized symptom management between January 2014 and May 2017. Nearly one-fifth (19.12%) tested positive for THC on urine drug testing. Users were younger, more likely to be men, single, and to have a history of cigarette smoking. Users also were likely to be more recently diagnosed and to have received radiotherapy. Certain moderate-to-severe symptoms, such as lack of appetite, shortness of breath, tiredness, difficulty sleeping, anxiety, and depression, were associated with use after accounting for sociodemographic and clinical differences between cannabis users and nonusers. Findings suggest patients seeking specialized symptom management are self-treating with cannabis, despite the lack of high-quality evidence for its use in palliative care. Unsanctioned use is likely to increase in cancer patients. Accurate information is urgently needed to help manage patient expectations for its use and increase understanding of risks and benefits.

2019 Reece et al explained the contemporary patterns of cannabis teratology. Cannabis has been shown to be teratogenic in cells, animals and humans. Particular targets of prenatal exposure

include brain, heart and blood vessels and chromosomal segregation. Three longitudinal clinical studies report concerning cortical dysfunction persisting into adolescence and beyond, which are pertinent to the autism epidemic.Increased rates of congenital heart defects, gastroschisis, anencephaly and others have been reported. The pattern of neuroteratology seen after cannabis exposure strongly suggests a spectrum of dysfunction from mild to moderate to very severe. Downs syndrome, atrial septal defect (secundum type), ventricular septal defect and anotia / microtia were noted to be more common in prenatally cannabis exposed children in a large US epidemiological study which would appear to have been confirmed by recent experience in Colorado and other USA states. Studies in cells, together with the above mentioned epidemiology, implicate cannabidiol, cannabichromene, cannabidivarin and other cannabinoids in significant genotoxicity and / or epigenotoxicity. Notch signalling has recently been shown to be altered by cannabinoids, which is highly pertinent to morphogenesis of the neuraxis and cardiovasculature, and also to congenital and inheritable cancer induction. It is felt that subtle neurobehavioural psychosocial and educational deficits will likely be the most common expression of cannabinoid teratology at the population level. The far reaching
implications of this wide spectrum of neuroteratological, pediatric cardiological and other defects and deficits should be carefully considered in increasingly liberal paradigms. Hence it is shown that the disparate presentations of cannabis teratology relate directly and closely to the distribution of CB1R's across the developing embryo and Cannabis has been shown to be teratogenic in cells, animals and humans. Particular targets of prenatal exposure include brain, heart and blood vessels and chromosomal segregation. Three longitudinal clinical studies report concerning cortical dysfunction persisting into adolescence and beyond, which are pertinent to the autism epidemic.Increased rates of congenital heart defects, gastroschisis, anencephaly and others have been reported. The pattern of neuroteratology seen after cannabis exposure strongly suggests a spectrum of dysfunction from mild to moderate to very severe. Downs syndrome, atrial septal defect (secundum type), ventricular septal defect and anotia / microtia were noted to be more common in prenatally cannabis exposed children in a large US epidemiological study which would appear to have been confirmed by recent experience in Colorado and other USA states. Studies in cells,
together with the above mentioned epidemiology, implicate cannabidiol, cannabichromene, cannabidivarin and other cannabinoids in significant genotoxicity and / or epigenotoxicity. Notch signalling has recently been shown to be altered by cannabinoids, which is highly pertinent to morphogenesis of the neuraxis and cardiovasculature, and also to congenital and inheritable cancer induction. It is felt that subtle neurobehavioural psychosocial and educational deficits will likely be the most common expression of cannabinoid teratology at the population level. The far reaching implications of this wide spectrum of neuroteratological, pediatric cardiological and other defects and deficits should be carefully considered in increasingly liberal paradigms. Hence it is shown that the disparate presentations of
cannabis teratology relate directly and closely to the distribution of CB1R's across the developing embryo and account for the polymorphous clinical presentations.

2019 Rogers et al investigated opioids and cannabis co-use among adults with chronic pain. Abstract: Opioid misuse constitutes a significant public health problem and is associated with a host of negative outcomes. Despite efforts to curb this increasing epidemic, opioids remain the most widely prescribed class of medications. Prescription opioids are often used to treat chronic pain despite the risks associated with use, and chronic pain remains an important factor in understanding this epidemic. Cannabis is another substance that has recently garnered attention in the chronic pain literature, as increasing numbers of individuals use cannabis to manage chronic pain. Importantly, the co-use of substances generally is associated with poorer outcomes than single substance use, yet little work has examined the impact of opioid-cannabis co-use. The current study examined the use of opioids alone, compared to use of opioid and cannabis co-use, among adults (n=450) with chronic pain on mental health, pain, and substance use outcomes. Results suggest that, compared to opioid use alone, opioid and cannabis co-use was associated with elevated anxiety and depression symptoms, as well as tobacco, alcohol, cocaine, and sedative use problems, but not pain experience. These findings highlight a vulnerable population of polysubstance users with chronic pain, and indicates the need for more comprehensive assessment and treatment of chronic pain.

2019 BMJ: Medicinal Use of Cannabis-based Products and Cannabinoids.What you need to know

- Cannabis based products for medicinal use contain cannabinoids derived from the cannabis plant, including Δ9-tetrahydrocannabinol (THC), cannabidiol (CBD), or a combination of THC and CBD. Synthetic cannabinoids for medicinal use typically mimic the effects of specific cannabinoids such as THC

- THC is the constituent of cannabis that causes the "high," whereas CBD is not intoxicating at typical doses. THC and CBD have contrasting mechanisms of action and therapeutic indications; THC carries a higher risk of adverse events compared with CBD
- Rescheduling on 1 November 2018 permits some unlicensed cannabis based products to be prescribed for the first time in the UK, but only by doctors on the relevant Specialist Register of the General Medical Council
- Indications for treatment, supported by evidence of low to moderate certainty, include chronic pain, some treatment resistant epilepsies, and nausea and vomiting caused by chemotherapy
- Non-medicinal CBD products are legal and widely available on the internet and from health food retailers, but they lack quality standards and should not be used for medicinal purposes

2019 Monte et al looked at acute illness associated with cannabis use caused by route of exposure. Abstract: Little is known about the relative harms of edible and inhalable cannabis products. Objective was to describe and compare adult emergency department (ED) visits related to edible and inhaled cannabis exposure. Chart review of ED visits between 1 January 2012 and 31 December 2016. A large urban academic hospital in Colorado. Adults with ED visits with a cannabis-related International Classification of Diseases, Ninth or 10th Revision, Clinical Modification (ICD-9-CM or ICD-10-CM), code. Patient demographic characteristics, route of exposure, dose, symptoms, length of stay, disposition, discharge diagnoses, and attribution of visit to cannabis. Results:There were 9973 visits with an ICD-9-CM or ICD-10-CM code for cannabis use. Of these, 2567 (25.7%) visits were at least partially attributable to cannabis, and 238 of those (9.3%) were related to edible cannabis. Visits attributable to inhaled cannabis were more likely to be for cannabinoid hyperemesis syndrome (18.0% vs. 8.4%), and visits attributable to edible cannabis were more likely to be due to acute psychiatric symptoms (18.0% vs. 10.9%), intoxication (48% vs. 28%), and cardiovascular symptoms (8.0% vs. 3.1%). Edible products accounted for 10.7% of cannabis-attributable visits between 2014 and 2016 but represented only 0.32% of total cannabis sales in Colorado (in kilograms of tetrahydrocannabinol) in that period. Limitation: Retrospective study design, single academic center, self-reported exposure data, and limited availability of dose data. Conclsions:Visits attributable to inhaled cannabis are more frequent than those attributable to edible cannabis, although the latter is associated with more acute psychiatric visits and more ED visits than expected.

2019 Workforce Drug Testing Positivity Climbs to Highest Rate Since 2004, According to New Quest Diagnostics Analysis. The rate of workforce drug positivity hit a fourteen-year high in 2018 according to more than ten million workplace drug test results. Positivity rates in the combined U.S. workforce increased nearly 5% in urine drug tests, climbing to the highest level since 2004. The positivity rate is now more than 25% higher than the thirty-year low of 3.5% recorded between 2010 and 2012. Marijuana continues to top the list of the most commonly detected illicit substances, Marijuana positivity increased across nearly all employee testing categories

2019 Agrawal et al looked at alcohol, cigarette and cannabis use between 2002 and 2016 in pregnant women. In the National Survey of Drug Use and Health, the adjusted prevalence of past 30-day cannabis use in pregnant women aged 18 to 44 years rose from 2.37% in 2002 to 3.85% in 2014.[1] Another study found a relatively similar increase from 4.2% in 2009 to 7.1% in 2014.[2] Corresponding rates of alcohol use (eg, 11.2% from 2001-2005 vs 10.2% from 2011-2013) and cigarette smoking (eg, 13.3% in 2002 vs 12.3% in 2010) during pregnancy have generally decreased.[3-5] These reports encourage more detailed characterization of patterns of substance use during the course of pregnancy.

2019 Twardovski et al looked at the Effects of Cannabis Use on Sedation Requirements for Endoscopic Procedures.Abstract: Cannabis (or marijuana) became legal for recreational use in Colorado in 2012, and this legislation change has created both challenges and opportunities in medicine. More patients are using cannabis, and more patients are now willing to admit cannabis use than in the past, which increases the likelihood that they will be forthcoming about use during medical questioning. Cannabis use may have implications during medical care, including procedural sedation.OBJECTIVE:To determine whether regular cannabis use had any effect on the dose of medication needed for sedation during endoscopic procedures.METHODS:A total of 250 medical records were reviewed from 1 endoscopy center and 1 endoscopist to minimize the variability in sedation technique for the study purposes. The cohort was reviewed with regard to age and gender to determine whether differences were present among different groups as to the relative amount of sedation medication required in cannabis users vs nonusers.
RESULTS: Medical records from 250 patients were reviewed, and researchers found that compared with people who did not regularly use cannabis, people who regularly used cannabis required an

amount of sedation for endoscopic procedures that was significantly higher (P=.05). The statistical significance persisted when adjusted for age, sex, and use of alcohol, benzodiazepines, and opiates. CONCLUSION: Determining cannabis use before procedural sedation can be an important tool for planning patient care and assessing both medication needs and possible risks related to increased dosage requirements during endoscopic procedures.

2019 Abuhasira et al investigated the epidemiological characteristics, safety and efficacy of medical cannabis in the elderly. There is a substantial growth in the use of medical cannabis in recent years and with the aging of the population, medical cannabis is increasingly used by the elderly. We aimed to assess the characteristics of elderly people using medical cannabis and to evaluate the safety and efficacy of the treatment. A prospective study that included all patients above 65 years of age who received medical cannabis from January 2015 to October 2017 in a specialized medical cannabis clinic and were willing to answer the initial questionnaire. Outcomes were pain intensity, quality of life and adverse events at six months. During the study period, 2736 patients above 65 years of age began cannabis treatment and answered the initial questionnaire. The mean age was 4.5 ± 7.5 years. The most common indications for cannabis treatment were pain (66.6%) and cancer (60.8%). After six months of treatment, 93.7% of the respondents reported improvement in their condition and the reported pain level was reduced from a median of 8 on a scale of 0-10 to a median of 4. Most common adverse events were: dizziness (9.7%) and dry mouth (7.1%). After six months, 18.1% stopped using opioid analgesics or reduced their dose. CONCLUSION: Our study finds that the therapeutic use of cannabis is safe and efficacious in the elderly population. Cannabis use may decrease the use of other prescription medicines, including opioids. Gathering more evidence-based data, including data from double-blind randomized-controlled trials, in this special population is imperative.

2019 Seltenrich investigated pesticide regulating in cannabis. Abstract: Outside Sonoma Lab Works' otherwise ordinary building in an anonymous business park, the distinct odor of pot pervades the air. However, it's not just any pot. It is the smell of strictly regulated, professionally cultivated, rigorously tested legal cannabis. Past the heavily tinted front door, the airy 8,000-square-foot facility is filled with fluorescent light and the hum of machines. Anyone who has ever visited a university chemistry department will recognize the long, white coats. Located on the outskirts of Santa Rosa, California, Sonoma Lab Works is one of 49 independent third-party laboratories statewide tasked with ensuring that the state's legal weed is also clean. It is not a simple task. For a price of $890 per sample,Sonoma Lab Works will run a full panel of tests on any cannabis-based product, in accordance with strict new state regulations rolled out over the course of 2018.Using instruments costing hundreds of thousands of dollars each, trained technicians take high-precision measurements of potency, moisture content, residual solvents, heavy metals, mycotoxins, microbial impurities, and pesticides.Products that do not meet the state's standards cannot be sold—legally, anyway.These rules represent the best efforts of California's recently formed Bureau of Cannabis Control (BCC) to protect consumers in the state's multibillion-dollar market. However, people within the burgeoning industry and the environmental health field have widely differing views of how well the BCC regulations accomplish that goal, particularly regarding pesticides. At least one thing is clear: California's response to the challenge has implications well beyond state lines.

2019 Tucker et al looked at types of cannabis and tobacco/nicotine co-usee and associated outcomes in young adulthood. Abstract: Cannabis and tobacco/nicotine use are highly comorbid. Given expanding access to cannabis through legalization for recreational use, it is important to understand how patterns of cannabis and tobacco/nicotine co-use are associated with young adult outcomes. A predominantly California-based sample of 2,429 young adults (mean age = 20.7) completed an online survey. Based on past-year reports of cannabis and tobacco/nicotine use, we defined 5 mutually exclusive groups: (a) single-product use; (b) concurrent use only (using both products, but only on separate occasions); (c) sequential use only (using both products on the same occasion, one right after the other, but not mixing them together); (d) coadministration only (using both products on the same occasion by mixing them in the same delivery device); and (e) both sequential use and coadministration. We examined group differences in use patterns, dependence, consequences of use, and psychosocial functioning. Fifty percent of respondents reported cannabis use, 43% tobacco/nicotine use, and 37% co-use of both substances. The most prevalent method of co-use involved smoking combustible products. Overall, individuals who co-used both substances on the same occasion in some way reported heavier use and greater problematic behaviors than those who did not. Sequential use (especially among those that also engaged in coadministration) was typically associated with worse physical and mental functioning overall compared to using each substance separately. Findings illuminate both prevalence and risks

associated with co-use of cannabis and tobacco/nicotine products and can inform policies for states considering regulation of cannabis and tobacco/nicotine products.

2019 Arkell et al found that CBD content in vaporized cannabis does not prevent THC-induced impairment of driving and cognition. Abstrat: The present study investigated and compared the effects of THC-dominant and THC/CBD equivalent cannabis on simulated driving and cognitive performance. In a randomized, double-blind, within-subjects crossover design, healthy volunteers ($n = 14$) with a history of light cannabis use attended three outpatient experimental test sessions in which simulated driving and cognitive performance were assessed at two timepoints (20–60 min and 200–240 min) following vaporization of 125 mg THC-dominant (11% THC; < 1% CBD), THC/CBD equivalent (11% THC, 11% CBD), or placebo (< 1% THC/CBD) cannabis. Both active cannabis types increased lane weaving during a car-following task but had little effect on other driving performance measures. Active cannabis types impaired performance on the Digit Symbol Substitution Task (DSST), Divided Attention Task (DAT) and Paced Auditory Serial Addition Task (PASAT) with impairment on the latter two tasks worse with THC/CBD equivalent cannabis. Subjective drug effects (e.g., "stoned") and confidence in driving ability did not vary with CBD content. Peak plasma THC concentrations were higher following THC/CBD equivalent cannabis relative to THC-dominant cannabis, suggesting a possible pharmacokinetic interaction. Cannabis containing equivalent concentrations of CBD and THC appears no less impairing than THC-dominant cannabis, and in some circumstances, CBD may actually exacerbate THC-induced impairment.

2019 Reece et al looked at the effect of cannabis legalization on US autism Incidence and medium term projections. Objective: In that cannabis use has been linked with the development of autism spectrum disorder like conditions in gestationally exposed children, we set out to explore the extent to which rising cannabis use might contribute to the rising autism epidemic. Methods: Datasets from US Department of Education Individuals with Disabilities Act (IDEA), National Survey of Drug Use and Health, and CDC's Autism and Developmental Disabilities Monitoring (ADDM) Network were investigated. Data on legal status was derived from SAMHSA. Results: IDEA had N=1,023 and ADDM N=87. Modelling of IDEA consistently showed that models quadratic-intime out-performed linear-only models. In both datasets, liberalisation of cannabis legislationwas associated with increased ASD. Slopes of ASD v time, cannabis v time and ASD v cannabis curves cannabis curves were shown to be related on graphical analysis by geofacet plots and tanglegrams (entanglement=0.3326). CDC's ADDM network quoted US autism incidence 168/10,000 in 2014. IDEA projections indicated rates 108.57, 131.67 and 166.49 in cannabis-illegal, -medical and -decriminalized states rising exponentially to 282.37, 396.91 and 455.54 by 2030. Conclusion: ASD is the commonest form of cannabis-associated clinical teratology. Using two independent datasets and two categorization methods we confirmed that medical, decriminalized and legal cannabis regimes are associated with higher rates of ASD than illegal ones. Findings are consistent with molecular, cellular and epigenetic mechanisms. Formerly quadratic regression curves become exponential when projected forwards to 2030; predict a lower quantum than the 2014 ADDM CDC figure; and indicate a 60% excess of cases in legal states by 2030.

2019 Ewing et al looked into the hepatoxicity of a cannabidiol-rich cannabis extract in the mouse model. The goal of this study was to investigate Cannabidiol (CBD) hepatotoxicity in 8-week-old male B6C3F1 mice. Animals were gavaged with either 0, 246, 738, or 2460 mg/kg of CBD (acute toxicity, 24 h) or with daily doses of 0, 61.5, 184.5, or 615 mg/kg for 10 days (sub-acute toxicity). These doses were the allometrically scaled mouse equivalent doses (MED) of the maximum recommended human maintenance dose of CBD in EPIDIOLEX® (20 mg/kg). In the acute study, significant increases in liver-to-body weight (LBW) ratios, plasma ALT, AST, and total bilirubin were observed for the 2460 mg/kg dose. In the sub-acute study, 75% of mice gavaged with 615 mg/kg developed a moribund condition between days three and four. As in the acute phase, 615 mg/kg CBD increased LBW ratios, ALT, AST, and total bilirubin. Hepatotoxicity gene expression arrays revealed that CBD differentially regulated more than 50 genes, many of which were linked to oxidative stress responses, lipid metabolism pathways and drug metabolizing enzymes. In conclusion, CBD exhibited clear signs of hepatotoxicity, possibly of a cholestatic nature. The involvement of numerous pathways associated with lipid and xenobiotic metabolism raises serious concerns about potential drug interactions as well as the safety of CBD.

2019 Mason et al conducted a systematic review of research on solitary alcohol and marijuana use in the United States. BACKGROUND AND AIMS:Alcohol use and marijuana use tend to be social

activities among adolescents. Some youth use alcohol or marijuana while alone. This article provides a framework for examining the risk factors for and consequences of solitary alcohol and marijuana use, grounded in a motivational model that emphasizes coping with negative emotions, and provides the first systematic review of research on solitary alcohol and marijuana use among middle school- and high school-aged adolescents in the United States.METHODS:PubMed, PsycINFO and Web of Science were searched. Articles were included if they mention solitary alcohol or marijuana (or illicit drug) use among adolescents aged 12-18 years. Studies on non-human animals, college students, non-English language publications and articles exclusively about solitary tobacco or inhalant use were excluded. Overall, 22 articles were selected.RESULTS:Prevalence of adolescent solitary alcohol and marijuana use was relatively high (e.g. 14% life-time solitary drinking in the general adolescent population), particularly in high-risk subgroups (e.g. 38.8% life-time solitary drinking in a sample of youth recruited from clinical and community settings). Risk factors for solitary alcohol and marijuana use include earlier onset and heavier use, coping motives, negative emotions and positive expectancies about use. Solitary alcohol and marijuana use are prospectively associated with later substance use disorder (SUD) symptoms, diminished academic performance and perceived health.CONCLUSIONS:Approximately 1 in 7 adolescents in the US appear to have engaged in solitary alcohol and marijuana use at some point. It is positively associated with extent of drinking and marijuana use, cop;ing motives, negative emotions, and positive expectancies, as well as subsequent SUD symptoms and poor academic and health-related outcomes.

2019 Hazekamp looked at the trouble with CBD Oil. Abstract: In just a few years, cannabidiol (CBD) has become immensely popular around the world. After initially being discovered as an effective self-medication for Dravet syndrome in children, CBD is now sold and used to treat a wide range of medical conditions and lifestyle diseases. The cannabinoid CBD, a non-psychoactive isomer of the more infamous tetrahydrocannabinol (THC), is available in a growing number of administration modes, but the most commonly known is CBD oil. There are currently dozens, if not hundreds, of producers and sellers of CBD oils active in the market, and their number is increasing rapidly. Those involved vary from individuals who prepare oils on a small scale for family and (Facebook) friends to compounding pharmacies, pharmaceutical companies, and licensed cannabis producers. Despite the growing availability of CBD, many uncertainties remain about the legality, quality, and safety of this new “miracle cure.” As a result, CBD is under scrutiny on many levels, ranging from national health organizations and agricultural lobbyists to the WHO and FDA. The central question is whether CBD is simply a food supplement, an investigational new medicine, or even a narcotic. This overview paper looks into the known risks and issues related to the composition of CBD products, and makes recommendations for better regulatory control based on accurate labeling and more scientifically supported health claims. The intention of this paper is to create a better understanding of the benefits versus the risks of the current way CBD products are produced, used, and advertised.

2019 Miller et al examined the regulation of Intraocular pressure. Abstract: It has been known for nearly 50 years that cannabis and the psychoactive constituent Δ9-tetrahydrocannabinol (THC) reduce intraocular pressure (IOP). Elevated IOP remains the chief hallmark and therapeutic target for glaucoma, a major cause of blindness. THC likely acts via one of the known cannabinoid-related receptors (CB1, CB2, GPR18, GPR119, GPR55) but this has never been determined explicitly. Cannabidiol (CBD) is a second major constituent of cannabis that has been found to be without effect on IOP in most studies.: Effects of topically applied THC and CBD were tested in living mice by using tonometry and measurements of mRNA levels. In addition the lipidomic consequences of CBD treatment were tested by using lipid analysis.We now report that a single topical application of THC lowered IOP substantially (∼28%) for 8 hours in male mice. This effect is due to combined activation of CB1 and GPR18 receptors each of which has been shown to lower ocular pressure when activated. We also found that the effect was sex-dependent, being stronger in male mice, and that mRNA levels of CB1 and GPR18 were higher in males. Far from inactive, CBD was found to have two opposing effects on ocular pressure, one of which involved antagonism of tonic signaling. CBD prevents THC from lowering ocular pressure. We conclude that THC lowers IOP by activating two receptors—CB1and GPR18—but in a sex-dependent manner. CBD, contrary to expectation, has two opposing effects on IOP and can interfere with the effects of THC.

2019 Whitehill et al looked at the incidence of pediatric cannabis exposure among children and teenagers from 0 to 19 before and after medical marijuana legalisation in Massachusettes. Cross-sectional comparison of pediatric cannabis exposure cases 4 years before and after MML in Massachusetts. The exposure cases included those of 218 children and teenagers aged between 0 and

19 years, as reported to the RPC from 2009 to 2016. Census data were used to determine the incidence. Data analysis was performed from November 12, 2018, to July 20, 2019. MAIN OUTCOMES AND MEASURES: Incidence of RPC-reported cannabis exposure cases, both single substance and polysubstance, for the age group of 0 to 19 years, and cannabis product type, coingestants, and clinical effects. RESULTS: During the 8-year study period (2009-2016), the RPC received 218 calls involving cannabis exposure (98 single substance, 120 polysubstance) in children and teenagers aged 0 to 19 years, representing 0.15% of all RPC calls in that age group for that period. Of the total exposure cases, males accounted for 132 (60.6%) and females 86 (39.4%). The incidence of single-substance cannabis calls increased from 0.4 per 100 000 population before MML to 1.1 per 100 000 population after (incidence rate ratio, 2.4; 95% CI, 1.5-3.9), a 140% increase. The age group of 15 to 19 years had the highest frequency of RPC-reported cannabis exposures (178 calls [81.7%]). The proportion of all RPC calls due to single-substance cannabis exposure increased overall for all age groups from 29 before MML to 69 afterward. Exposure to edible products increased after MML for most age groups. CONCLUSIONS AND RELEVANCE:Pediatric cannabis exposure cases increased in Massachusetts after medical marijuana was legalized in 2012, despite using childproof packaging and warning labels. This study provides additional evidence suggesting that MML may be associated with an increase in cannabis exposure cases among very young children, and extends prior work showing that teenagers are also experiencing increased cannabis-related health system contacts via the RPC. Additional efforts are needed to keep higher-potency edible products and concentrated extracts from children and teenagers, especially considering the MML and retail cannabis sales in an increasing number of US states.

2019 Demontis et al looked at CHRNA2 in cannabis use disorder. Abstract:
Cannabis is the most frequently used illicit psychoactive substance worldwide; around one in ten users become dependent. The risk for cannabis use disorder (CUD) has a strong genetic component, with twin heritability estimates ranging from 51 to 70%. Here we performed a genome-wide association study of CUD in 2,387 cases and 48,985 controls, followed by replication in 5,501 cases and 301,041 controls. We report a genome-wide significant risk locus for CUD ($P = 9.31 \times 10\text{-}12$) that replicates in an independent population ($P_{replication} = 3.27 \times 10\text{-}3$, $P_{meta\text{-}analysis} = 9.09 \times 10\text{-}12$). The index variant (rs56372821) is a strong expression quantitative trait locus for cholinergic receptor nicotinic α2 subunit (CHRNA2); analyses of the genetically regulated gene expression identified a significant association of CHRNA2 expression with CUD in brain tissue. At the polygenic level, analyses revealed a significant decrease in the risk of CUD with increased load of variants associated with cognitive performance. The results provide biological insights and inform on the genetic architecture of CUD.

2019 Roberts looked at legalised cannabis in Colorado emergency departments. Abstract: Cannabis legalization has led to significant health consequences, particularly to patients in emergency departments and hospitals in Colorado. The most concerning include psychosis, suicide, and other substance abuse. Deleterious effects on the brain include decrements in complex decision-making, which may not be reversible with abstinence. Increases in fatal motor vehicle collisions, adverse effects on cardiovascular and pulmonary systems, inadvertent pediatric exposures, cannabis contaminants exposing users to infectious agents, heavy metals, and pesticides, and hash-oil burn injuries in preparation of drug concentrates have been documented. Cannabis dispensary workers (“budtenders”) without medical training are giving medical advice that may be harmful to patients. Cannabis research may offer novel treatment of seizures, spasticity from multiple sclerosis, nausea and vomiting from chemotherapy, chronic pain, improvements in cardiovascular outcomes, and sleep disorders. Progress has been slow due to absent standards for chemical composition of cannabis products and limitations on research imposed by federal classification of cannabis as illegal. Given these factors and the Colorado experience, other states should carefully evaluate whether and how to decriminalize or legalize non-medical cannabis use.

2019 Meir et al looked at cannabis concentrate use in adolescents. **Abstract:** Cannabis concentrates, which are cannabis plant extracts that contain high concentrations of Δ-9-tetrahydrocannbinol (THC), have become increasingly popular among adults in the United States. However, no studies have reported on the prevalence or correlates of cannabis concentrate use in adolescents, who, as a group, are thought to be particularly vulnerable to the harms of THC.
METHODS: Participants are a racially and ethnically diverse group of 47 142 8th-, 10th-, and 12th-grade students recruited from 245 schools across Arizona in 2018. Participants reported on their lifetime and past-month marijuana and cannabis concentrate use, other substance use, and risk and protective factors for substance use problems spanning multiple life domains (ie, individual, peer, family, school, and community).
RESULTS: Thirty-three percent of all 8th-, 10th-, and 12th-graders reported lifetime cannabis use, and 24% reported lifetime concentrate use. Seventy-two percent of all lifetime cannabis users had used concentrates. Relative to adolescent

cannabis users who had not used concentrates, adolescent concentrate users were more likely to use other substances and to experience more risk factors, and fewer protective factors, for substance use problems across numerous life domains. **CONCLUSIONS:** Most adolescent cannabis users have used concentrates. Based on their risk and protective factor profile, adolescent concentrate users are at higher risk for substance use problems than adolescent cannabis users who do not use concentrates. Findings raise concerns about high-risk adolescents exposure to high-THC cannabis.

2019 Rotermenn analysed the trends in the prevalence of cannabis use and related metrics in Canada. Data from the Canadian Tobacco, Alcohol and Drugs Survey and the Canadian Tobacco Use Monitoring Survey were used to examine longer-term (historical) rates of use during 2004 to 2017. Five iterations of the National Cannabis Surveys (NCS) (2018-2019) were used to examine current use (overall, daily or almost daily (DAD), quantities, and types of products) in the months before and after legalization. RESULTS:From 2004 through 2017 cannabis use decreased among 15 to 17 year olds, remained stable for 18 to 24 year olds, and increased among adults aged 25 to 64. During 2018 and into 2019, rates of cannabis use increased overall from 14% to 18%; with statistically significant increases also for males generally (16% to 22%) and males aged 18 to 64. Rates of cannabis use remained largely stable for females (13%) and seniors (4%). In 2019, about 60% of consumers reported using one cannabis product; use of dried cannabis (flower/leaf) was the most common (84.2%). The average user consumed 27.5 grams of dried cannabis (flower/leaf) over three months; amounts consumed varied depending on use frequency (e.g. occasional users: 2.6 grams/3 months versus DAD users: 62.6 grams/3 months). DISCUSSION:Results highlight the importance of understanding pre-legalization behaviours as changes in use after legalization may have begun prior to the legislation. NCS allows for the early impacts of legalisation to be examined and provides a picture of not only changes in who is using but also what and how much.

2019 Gardiner et al reported that health professionals were wary of medicinal cannabis use and its adverse effects. 26 published studies conducted in Australia, the United States, Canada, Ireland and internationally were analysed These studies assessed the beliefs, knowledge and concerns about medicinal cannabis held by medical practitioners, nurses, pharmacists and allied health professionals Generally, health professionals supported clinical use of medicinal cannabis, however they said they lacked knowledge across all aspects, from pharmacology and dosing to legislation around access, distribution and supply Their greatest concerns about the drug were patient harm, adverse drug interactions and whether cannabis would be obtained 'medicinally' as a legal guise for recreational use

2019 Shover et al found that the Association between medical cannabis laws and opioid overdose mortality has reversed over time. Medical cannabis has been touted as a solution to the US opioid overdose crisis since Bachhuber et al. [M. A. Bachhuber, B. Saloner, C. O. Cunningham, C. L. Barry, *JAMA Intern. Med.* 174, 1668–1673] found that from 1999 to 2010 states with medical cannabis laws experienced slower increases in opioid analgesic overdose mortality. That research received substantial attention in the scientific literature and popular press and served as a talking point for the cannabis industry and its advocates, despite caveats from the authors and others to exercise caution when using ecological correlations to draw causal, individual-level conclusions. In this study, we used the same methods to extend Bachhuber et al.'s analysis through 2017. Not only did findings from the original analysis not hold over the longer period, but the association between state medical cannabis laws and opioid overdose mortality reversed direction from −21% to +23% and remained positive after accounting for recreational cannabis laws. We also uncovered no evidence that either broader (recreational) or more restrictive (low-tetrahydrocannabinol) cannabis laws were associated with changes in opioid overdose mortality. We find it unlikely that medical cannabis—used by about 2.5% of the US population—has exerted large conflicting effects on opioid overdose mortality. A more plausible interpretation is that this association is spurious. Moreover, if such relationships do exist, they cannot be rigorously discerned with aggregate data. Research into therapeutic potential of cannabis should continue, but the claim that enacting medical cannabis laws will reduce opioid overdose death should be met with skepticism.

2019 Freeman et al reported on the medical use of Cannabis-based producta and cannabinoids: What you need to know:

- Cannabis based products for medicinal use contain cannabinoids derived from the cannabis plant, including Δ9-tetrahydrocannabinol (THC), cannabidiol (CBD), or a combination of THC and CBD. Synthetic cannabinoids for medicinal use typically mimic the effects of specific cannabinoids such as THC

- THC is the constituent of cannabis that causes the "high," whereas CBD is not intoxicating at typical doses. THC and CBD have contrasting mechanisms of action and therapeutic indications; THC carries a higher risk of adverse events compared with CBD
- Rescheduling on 1 November 2018 permits some unlicensed cannabis based products to be prescribed for the first time in the UK, but only by doctors on the relevant Specialist Register of the General Medical Council
- Indications for treatment, supported by evidence of low to moderate certainty, include chronic pain, some treatment resistant epilepsies, and nausea and vomiting caused by chemotherapy)
- Non-medicinal CBD products are legal and widely available on the internet and from health food retailers, but they lack quality standards and should not be used for medicinal purposes

2019 Layden et al investigated pulmonary illness related to e-cigarette use in Illinois and Wisconsin. Abstract:E-cigarettes are battery-operated devices that heat a liquid and deliver an aerosolized product to the user. Pulmonary illnesses related to e-cigarette use have been reported, but no large series has been described. In July 2019, the Wisconsin Department of Health Services and the Illinois Department of Public Health received reports of pulmonary disease associated with the use of e-cigarettes (also called vaping) and launched a coordinated public health investigation. We defined case patients as persons who reported use of e-cigarette devices and related products in the 90 days before symptom onset and had pulmonary infiltrates on imaging and whose illnesses were not attributed to other causes. Medical record abstraction and case patient interviews were conducted with the use of standardized tools. There were 53 case patients, 83% of whom were male; the median age of the patients was 19 years. The majority of patients presented with respiratory symptoms (98%), gastrointestinal symptoms (81%), and constitutional symptoms (100%). All case patients had bilateral infiltrates on chest imaging (which was part of the case definition). A total of 94% of the patients were hospitalized, 32% underwent intubation and mechanical ventilation, and one death was reported. A total of 84% of the patients reported having used tetrahydrocannabinol products in e-cigarette devices, although a wide variety of products and devices was reported. Syndromic surveillance data from Illinois showed that the mean monthly rate of visits related to severe respiratory illness in June through August of 2019 was twice the rate that was observed in the same months in 2018. Case patients presented with similar clinical characteristics. Although the features of e-cigarette use that were responsible for injury have not been identified, this cluster of illnesses represents an emerging clinical syndrome or syndromes. Additional work is needed to characterize the pathophysiology and to identify the definitive causes.

2019 Blayer & Barnes looked st the contribution of marijuana legalisation to the US opioid Mortality Epidemic (not yet peer-reviewed). . Abstract: **Background:** Prior studies of U.S. states as of 2013 and one state as of 2015 suggested that marijuana availability reduces opioid mortality (marijuana protection hypothesis). This investigation tested the hypothesis with opioid mortality trends updated to 2017 and by evaluating all states and the District of Columbia (D.C.). **Methods:** Opioid mortality data obtained from the U.S. Centers for Disease Control and Prevention were used to compare opioid death rate trends in each marijuana-legalizing state and D.C. before and after medicinal and recreational legalization implementation and their individual and cumulative aggregate trends with concomitant trends in non-legalizing states. The Joinpoint Regression Program identified statistically-significant mortality trends and when they occurred. **Results:** Of 23 individually evaluable legalizing jurisdictions, 78% had evidence for a statistically-significant acceleration of opioid death rates after medicinal or recreational legalization implementation at greater rates than their pre-legalization rate or the concurrent composite rate in non-legalizing states. All four jurisdictions evaluable for recreational legalization had evidence ($p < 0.05$) for subsequent opioid death rate increases, one had a distinct acceleration, and one a reversal of prior decline. Since 2009-2012, when the cumulative-aggregate opioid death rate in the legalizing jurisdictions was the same as in the non-legalizing group, the legalizing group′s rate accelerated increasingly faster ($p=0.009$). By 2017 it was 67% greater than in the non-legalizing group ($p<0.05$). **Conclusions:** The marijuana protection hypothesis is not supported by recent U.S. data on opioid mortality trends. Instead, legalizing marijuana appears to have contributed to the nation′s opioid mortality epidemic

2019 Fernandez et al discovered how marijuana use can increase your risk for an alcohol overdose. Abstract: Alcohol can lead to fatal and nonfatal overdose (OD) through its neurobiological inhibitory effects when used alone or with other drugs. Little research has examined alcohol OD characteristics in the context of concomitant drug use. This study utilized alcohol OD data (defined as alcohol poisoning, passing out, or blacking out) collected in a large residential addiction treatment facility ($N = 660$).

Latent class analysis identified classes of alcohol OD events based on concomitant drug use at the time of OD. We evaluated correlates of alcohol OD classes, including depression, emergency medical services, and hospitalization, using latent class regression. Only 20% of alcohol ODs involved alcohol alone. Marijuana was the most commonly used drug during the most recent alcohol OD (43.2%), followed by sedatives (27.9%), cocaine or crack (25.9%), prescription opioids (26.1%), and heroin (20%). The final latent class model included 3 classes: no/low drug involvement (61%), moderate drug involvement (33%), and high drug involvement (6%). Relative to the no/low drug involvement class, participants admitted to the hospital were 6.4-fold more likely to be in the high drug involvement class (95% CI: 2.4 to 16.6) and 2.9-fold more likely to be in the moderate drug involvement class (95% CI: 1.2 to 7.2). Participants receiving emergency medical services were more likely to be in the high drug involvement class (aOR: 2.2, 95% CI: 2.2, 1.1 to 4.5) and less likely to be in the moderate drug involvement class (aOR 0.39, 95% CI: 0.2 to 0.96). Combining drug classes with alcohol prior to OD was common and associated with a higher likelihood of hospitalization. Overdose prevention efforts should address acute risks of alcohol ingestion with other drugs.

2019 Cerda et al investigated the association between recreational marijuana legalisation in the US and changes in marijuana use and CUD from 2008 to 2016. Problematic use of marijuana among adolescents and adults increased after legalization of recreational marijuana use, according to a new study from NYU Grossman School of Medicine and Columbia University Mailman School of Public Health.Published online November 13 in *JAMA Psychiatry*, the study is the first to look at the impact of recreational marijuana legalization on both use and cannabis use disorder (commonly referred to as problematic marijuana use) across multiple age groups. Presently, 11 states and Washington, D.C. have legalized marijuana for recreational use while 33 states and D.C. have legalized marijuana for medical use.

2019 Madras et al looked at the associations of parental marijuanba use with offspring marijuana, alcohol and tobacco and opioid misuses. Abstract: Marijuana use is increasing among adults and often co-occurs with other substance use; therefore, it is important to examine whether parental marijuana use is associated with elevated risk of substance use among offspring living in the same household. To examine associations of parental marijuana use with offspring marijuana, tobacco, and alcohol use and opioid misuse. This cross-sectional study used survey data from the 2015 through 2018 National Surveys on Drug Use and Health (NSDUH), which provide nationally representative data on adolescents or young adults living with a parent (the mother or the father). Annual average percentages were based on survey sampling weights. Final analyses were conducted September 21 through 23, 2019. Parental marijuana use status. Offspring self-reported use of marijuana, tobacco, or alcohol or misuse of opioids. **Results** Survey respondents included 24 900 father-offspring or mother-offspring dyads sampled from the same household. Among mothers living with adolescent offspring, 8.2% (95% CI, 7.3%-9.2%) had past-year marijuana use, while 7.6% (95% CI, 6.2%-9.2%) of mothers living with young adult offspring had past-year marijuana use. Among fathers living with adolescent offspring, 9.6% (95% CI, 8.5%-10.8%) had past-year marijuana use, and 9.0% (95% CI, 7.4%-10.9%) of fathers living with young adult offspring had past-year marijuana use. Compared with adolescents whose mothers never used marijuana, adjusted relative risk (ARR) of past-year marijuana use was higher among those whose mothers had lifetime (without past-year) marijuana use (ARR, 1.3; 95% CI, 1.1-1.6; *P* = .007), less than 52 days of past-year marijuana use (ARR, 1.7; 95% CI, 1.1-2.7; *P* = .02), or 52 days or more of past-year marijuana use (ARR, 1.5; 95% CI, 1.1-2.2; *P* = .02). Compared with young adults whose mothers never used marijuana, adjusted risk of past-year marijuana use was higher among those whose mothers had lifetime (without past-year) marijuana use (ARR, 1.4; 95% CI, 1.1-1.7; *P* = .001), less than 52 days of past-year marijuana use (ARR, 1.5; 95% CI, 1.0-2.3; *P* = .049), or 52 days or more of past-year marijuana use (ARR, 1.8; 95% CI, 1.3-2.5; *P* = .002). Compared with adolescents whose fathers never used marijuana, adolescents whose fathers had less than 52 days of past-year marijuana use were more likely to use marijuana (ARR, 1.8; 95% CI, 1.2-2.7; *P* = .006). Compared with young adults whose fathers never used marijuana, young adults whose fathers had 52 days or more of past-year marijuana use were more likely to use marijuana (ARR, 2.1; 95% CI, 1.6-2.9; *P* < .001). Compared with their peers whose parents never used marijuana and after adjusting for covariates, the adjusted risk of past-year tobacco use was higher among adolescents whose mothers had lifetime marijuana use (ARR, 1.3; 95% CI, 1.0-1.6; *P* = .03), less than 52 days of past-year marijuana use (ARR, 1.5; 95% CI, 1.0-2.1; *P* = .04), or 52 days or more of past-year marijuana use (ARR, 1.6; 95% CI, 1.1-2.3; *P* = .03); adolescents whose fathers had lifetime marijuana use (ARR, 1.5; 95% CI, 1.1-1.9; *P* = .004) or 52 days or more of past-year marijuana use (ARR, 1.8; 95% CI, 1.2-2.7; *P* = .006); young adults whose mothers had lifetime marijuana use (ARR, 1.2; 95% CI, 1.0-1.4; *P* = .04); and young adults whose fathers

had 52 days or more of past-year marijuana use (ARR, 1.4; 95% CI, 1.0-1.9; *P* = .046). Compared with their peers whose parents had no past marijuana use and after adjusting for covariates, risk of past-year alcohol use was higher among adolescents whose mothers had lifetime marijuana use (ARR, 1.2; 95% CI, 1.1-1.4; *P* = .004), less than 52 days of past-year marijuana use (ARR, 1.5; 95% CI, 1.2-1.9; *P* = .002), or 52 days or more of past-year marijuana use (ARR, 1.3; 95% CI, 1.0-1.7; *P* = .04). After adjusting for covariates, parental marijuana use was not associated with opioid misuse by offspring. **Conclusions and Relevance** In this cross-sectional study, parental marijuana use was associated with increased risk of substance use among adolescent and young adult offspring living in the same household. Screening household members for substance use and counseling parents on risks posed by current and past marijuana use are warranted.

2019 Steigerwaldt et al looked at differences in opinionabout marijuana use and prevalence of use by state legaliszation status: Abstract
Beliefs about marijuana use and prevalence of use may be associated with the legalization status of the state of residence. We examined differences in views and rates of use of marijuana among residents in recreationally legal, medically legal, and nonlegal states. We surveyed a nationally representative online panel of US adults (N = 16,280) and stratified results by marijuana legalization status of states. We compared views of residents of recreational states on benefits and risks of marijuana use to residents in other states.
The response rate was 56.3% (n = 9003). Residents in recreationally legal states were more likely to believe marijuana could be beneficial for pain management (73% in recreationally legal states, 67% in medically legal states, 63% in nonlegal states; *P* value: <0.0001), provide relief from stress, anxiety or depression (52% in recreationally legal states, 47% in medically legal states, 46% in nonlegal states; *P* value: 0.01), and improve appetite (39% in recreationally legal states, 36% in medically legal states, 33% in nonlegal states; *P* value: <0.009). In addition, residents in recreational states were significantly more likely to believe that smoking 1 marijuana joint a day is somewhat or much safer than smoking 1 cigarette a day (40.8% in recreationally legal states, 39.1% in medically legal states, and 36.1% in nonlegal states; *P* value: <0.0001). Residents of recreationally and medically legal states were more likely to believe second-hand marijuana smoke was somewhat or much safer than second-hand tobacco smoke (38.3% in recreationally legal states, 38.3% in medically legal states, and 35.7% in nonlegal states; *P* value: 0.003). Past-year marijuana use in any form (20% in recreational, 14.1% in medical, 12% in nonlegal) and past-year marijuana use of multiple forms (11.1% in recreational, 6.1% in medical, 4.9% in nonlegal) were highest among residents of recreationally legal states. Overall, prevalence of past-year use of any form of marijuana use was more common among residents of recreationally legal states compared with other states (20.3%, confidence interval [CI] 19.5, 21.1 in recreationally legal states; 15.4%, CI 14.7, 16.2 in medically legal states; 11.9%, CI 11.2, 12.6 in nonlegal states).
Residents in recreationally legal states were most likely to believe marijuana has benefits, marijuana smoke is safer than tobacco smoke, and have the highest rate of marijuana use. This is cause for concern, given the tide of commercialization, growing number of high-potency cannabis products, and favorable media coverage promoting use for health problems. Residents in recreationally legal states were most likely to believe marijuana has benefits, marijuana smoke is safer than tobacco smoke, and have the highest rate of marijuana use. This is cause for concern, given the tide of commercialization, growing number of high-potency cannabis products, and favorable media coverage promoting use for health problems.

2019 Cuttler et al looked at short and long-term effects of cannabis on headache and migraine.
Abstract: Use of cannabis to alleviate headache and migraine is relatively common, yet research on its effectiveness remains sparse. We sought to determine whether inhalation of cannabis decreases headache and migraine ratings as well as whether gender, type of cannabis (concentrate vs. flower), THC, CBD, or dose contribute to changes in these ratings. Finally, we explored evidence for tolerance to these effects. Archival data were obtained from StrainprintTM, a medical cannabis app that allows patients to track symptoms before and after using different strains and doses of cannabis. Latent change score models and multilevel models were used to analyze data from 12,293 sessions where cannabis was used to treat headache and 7,441 sessions where cannabis was used to treat migraine. There were significant reductions in headache and migraine ratings after cannabis use. Men reported larger reductions in headache than women and use of concentrates was associated with larger reductions in headache than flower. Further, there was evidence of tolerance to these effects. Perspective: Inhaled cannabis reduces self-reported headache and migraine severity by approximately 50%. However, its

effectiveness appears to diminish across time and patients appear to use larger doses across time, suggesting tolerance to these effects may develop with continued use.

2019 Reece and Hulse looked at how cannabis consumption patterns explain the east-west gradient in Canadian neural tube defect incidence. While a known link between prenatal cannabis exposure and anencephaly exists, the relationship of prenatal cannabis exposure with neural tube defects (NTDs) generally has not been defined. Published data from Canada Health and Statistics Canada were used to assess this relationship. Both cannabis use and NTDs were shown to follow an east-west and north-south gradient. Last year cannabis consumption was significantly associated ($P < .0001$; cannabis use–time interaction $P < .0001$). These results were confirmed when estimates of termination for anomaly were used. Canada Health population data allowed the calculation of an NTD odds ratio) of 1.27 (95% confidence interval = 1.19-1.37; $P < 10^{-11}$) for high-risk provinces versus the remainder with an attributable fraction in exposed populations of 16.52% (95% confidence interval = 12.22-20.62). Data show a robust positive statistical association between cannabis consumption as both a qualitative and quantitative variable and NTDs on a background of declining NTD incidence. In the context of multiple mechanistic pathways these strong statistical findings implicate causal mechanisms.

2019 Reece and Hulse found that Cannabis Teratology Explains Current Patterns of Coloradan Congenital Defects: The Contribution of Increased Cannabinoid Exposure to Rising Teratological Trends. Rising Δ9-tetrahydrocannabinol concentrations in modern cannabis invites investigation of the teratological implications of prenatal cannabis exposure. Data from Colorado Responds to Children with Special Needs (CRCSN), National Survey of Drug Use and Health, and Drug Enforcement Agency was analyzed. Seven, 40, and 2 defects were rising, flat, and falling, respectively, and 10/12 summary indices rose. Atrial septal defect, spina bifida, microcephalus, Down's syndrome, ventricular septal defect, and patent ductus arteriosus rose, and along with central nervous system, cardiovascular, genitourinary, respiratory, chromosomal, and musculoskeletal defects rose 5 to 37 times faster than the birth rate (3.3%) to generate an excess of 11 753 (22%) major anomalies. Cannabis was the only drug whose use grew from 2000 to 2014 while pain relievers, cocaine, alcohol, and tobacco did not. The correlation of cannabis use with major defects in 2014 (2019 dataset) was $R = .77$, $P = .0011$. Multiple cannabinoids were linked with summary measures of congenital anomalies and were robust to multivariate adjustment.

2019 Chandra et al looked at new trends in cannabis potency in USA and Europe during the last decade 2008-2017. Through the potency monitoring program at the University of Mississippi supported by National Institute on Drug Abuse (NIDA), a total of 18108 samples of cannabis preparations have been analyzed over the last decade, using a validated GC/FID method. The samples are classified as sinsemilla, marijuana, ditchweed, hashish, and hash oil (now referred to as cannabis concentrate). The number of samples received over the last 5 years has decreased dramatically due to the legalization of marijuana either for medical or for recreational purposes in many US states. The results showed that the mean Δ9-THC concentration has increased dramatically over the last 10 years, from 8.9% in 2008 to 17.1% in 2017. The mean Δ9-THC:CBD ratio also rose substantially from 23 in 2008 to 104 in 2017. There was also marked increase in the proportion of hash oil samples (concentrates) seized (0.5-4.7%) and their mean Δ9-THC concentration (6.7-55.7%) from 2008 to 2017. Other potency monitoring programs are also present in several European countries such as The Netherlands, United Kingdom, France, and Italy. These programs have also documented increases in Δ9-THC concentrations and Δ9-THC:CBD ratios in cannabis. These trends in the last decade suggest that cannabis is becoming an increasingly harmful product in the USA and Europe.

2020 Nazarov et al looked at a near doubling of homicide victims of marijuana use in 2016 from 2004. Researchers assessed the time trends in alcohol and marijuana detected in homicide victims and found that the prevalence of marijuana almost doubled, increasing from 22 percent in 2004 to 42 percent in 2016. Alternately, the prevalence of alcohol declined slightly from 40 percent in 2004 to 35 percent in 2016.

2020 Bao et al looked at a neonate death due to marijuana toxicity to the liver and adrenals. BACKGROUND Marijuana is the considered the most widely available and used drug across the world. Up to this time, there have been no reports of human death directly caused by acute marijuana toxicity in adults, fetuses, or newborn neonates. CASE REPORT We report a death of an 11-day-old white female neonate due to acute marijuana toxicity. She died of extensive necrosis and hemorrhage of the liver and adrenals due to maternal use of marijuana. CONCLUSIONS This case is unique in that other possible causes of death can be eliminated. With growing use of marijuana by pregnant women and increases in newborn drug screening of umbilical cord homogenate, more cases of neonatal death due to acute marijuana toxicity could be discovered.

2020 Goodman et al looked at the prevalence and forms of cannabis use in legal vs. illegal redreational cannabis markets. Recreational or ‘non-medical cannabis’ has been legalized in several US states, and was legalized federally in Canada in October 2018. There is little comparative data on product use across jurisdictions, particularly with respect to the types of cannabis products used, which differentially impact health. Data are from Wave 1 of the International Cannabis Policy Study, collected from Aug 27–Oct 7, 2018. Respondents (n = 27,024) aged 16–65 completed an online survey measuring patterns of cannabis use, quantities and routes of administration. Respondents were recruited from Canada (n = 9976) and US states that had (n = 7362) and had not (n = 9686) legalized non-medical cannabis (‘legal’ and ‘illegal’ states, respectively).
Prevalence of at least daily, weekly, and monthly cannabis use were significantly higher in US ‘legal’ states (11.3%, 18.2%, 25.0%, respectively) than US ‘illegal’ states (7.4%, 11.6%, 16.8%, respectively; $p<0.001$) and Canada (8.9%, 14.1%, 19.0%, respectively; $p \leq 0.01$). Dried herb was the dominant form of cannabis reported by past 12-month users across all jurisdictions (77.7%–80.8%). Although the amount of dried herb used per year did not differ by jurisdiction (range: 210.3–229.4 g), those in US ‘legal’ states were significantly more likely to use dried herb daily or weekly than were those in ‘illegal’ states and Canada ($p<0.001$). Use of cannabis concentrates, vaped oils, edibles, and drinks was more prevalent among US ‘legal’ states than ‘illegal’ states and Canada ($p \leq 0.001$). Vaping dried herb was more common in both legal and illegal US jurisdictions than in Canada ($p<0.05$), whereas Canadians were more likely to smoke dried herb with tobacco ($p<0.001$).
The prevalence of cannabis use—and use of products such as cannabis concentrates, edibles and drinks—was higher in US states that had legalized cannabis. Additional longitudinal research is required to determine whether these differences reflect causal effects of legalization or pre-existing secular trends.

2020 Kruger et al looked at cannabis enthusiasts’ knowledge of medical treatment effectiveness and increased risks of cannabis use.PURPOSE:To compare cannabis enthusiasts' knowledge about cannabis risks and effectiveness in treating medical conditions with existing empirical evidence. DESIGN:A brief survey assessed cannabis use, information sources, and knowledge about risks and effectiveness.SETTING:A cannabis advocacy event in April 2019 in a state with legal medical and recreational cannabis.PARTICIPANTS:Demographically diverse adults (N = 472) who frequently used cannabis; 85% used cannabis for health or medical purposes.MEASURES:Participants reported the sources of their cannabis information, health conditions they thought cannabis was effective in treating (n = 10), and health risks increased by cannabis (n = 6). Conditions and risks were based on ratings of evidence (ie, from substantial to insufficient) for therapeutic effects and risks identified in a review by The National Academies of Sciences, Engineering, and Medicine (NASEM, 2017).ANALYSES:Chi-square tests examined the correspondence between participants' knowledge and NASEM conclusions. RESULTS:Most participants' (95% confidence interval [CI]: 74%-81%) knowledge of cannabis was from their own experiences; 18% (95% CI: 14%-21%) received information from primary care providers. On average, participants' beliefs matched NASEM conclusions for half of effectiveness (95% CI: 50%-53%) and risk items (95% CI: 55%-57%). Many (95% CI: 38%-42%) thought that cannabis use did not increase any risk. Contrary to NASEM conclusions, many thought cannabis was effective in treating cancer (76%), depressive symptoms (72%), and epilepsy (68%). Those who received cannabis information from their primary care providers had better knowledge of medical effectiveness. Medicinal cannabis use frequency inversely predicted knowledge of medical effectiveness and increased risks of adverse events.CONCLUSION:There were considerable discrepancies between cannabis users' knowledge and available evidence, highlighting the need for more research and education (by physicians, caregivers, and dispensaries) on effectiveness and health risks, especially for users with specific health issues such as pregnant women and people with depression.

2020 Block et al examined adolescent substance use through opportunity theory. ABSTRACTThe present study examines substance use behaviors of middle and high school students, focusing on how varying influences of opportunity measures impact use of specific types of substances. The data used in the present study come from almost 4,000 students within 89 school contexts from students attending public school in a Southern state. Hierarchical logistic modeling is used to explore the influence of various opportunities at both the student and school levels on the use of different types of substances. Results indicate measures of opportunity at both the student and school levels were significant; however, measures at the individual level were consistently more influential.

2020 Murray et al asked the question:'Will legalization and commercialization of cannabis use increase the incidence and prevalence of psychosis? He concluded:
Is it inevitable that legalization of recreational cannabis will result in more dependence and psychosis? In theory, it is possible to legalize cannabis in ways that do not increase potency and prevalence of use but, so far, experience with commercialization in North Americais not encouraging.Governmentsthat decide to legalizecannabis should usesomeof the tax revenue to monitor cannabis price, consumption, and potency levels and to carefully evaluate the longterm repercussions for mental health in different US states and Canadian provinces. Such monitoring would enable policies to be developed to minimize harm. In the absence of such an approach, itseemslikely that the current commercialization of recreational cannabis in North America will be followed in a fewyears by a rise in the incidence ofnewcases of psychosis and in the prevalence of people with more chronic psychoses.

2020 Reece et Hulse looked at Canadian cannabis consumption and patterns of congenital anomalies.Abstract: Cannabis is a known teratogen. Data availability addressing both major congenital anomalies and cannabis use allowed us to explore their geospatial relationships. Data for the years 1998 to 2009 from Canada Health and Statistics Canada was analyzed in R. Maps have been drawn and odds ratios, principal component analysis, correlation matrices, least squares regression and geospatial regression analyses have been conducted using the R packages base, dplyr, epiR, psych, ggplot2, colorplaner and the spml and spreml functions from package splm. Mapping showed cannabis use was more common in the northern Territories of Canada in the Second National Survey of Cannabis Use 2018. Total congenital anomalies, all cardiovascular defects, orofacial clefts, Downs syndrome and gastroschisis were all found to be more common in these same regions and rose as a function of cannabis exposure. When Canada was dichotomized into high and low cannabis use zones by Provinces v Territories the Territories had a higher rate of total congenital anomalies 450.026 v 390.413 (O.R. = 1.16 95%C.I. 1.08-1.25, P = 0.000058; attributable fraction in exposed 13.25%, 95%C.I. 7.04–19.04%). In geospatial analysis in a spreml spatial error model cannabis was significant both alone as a main effect ($P < 2.0 \times 10^{-16}$) and in all its first and second order interactions with both tobacco and opioids from $P < 2.0 \times 10^{-16}$. These results show that the northern Territories of Canada share a higher rate of cannabis use together with elevated rates of total congenital anomalies, all cardiovascular defects, Down's syndrome and gastroschisis. This is the second report of a significant association between cannabis use and both total defects and all cardiovascular anomalies and the fourth published report of a link with Downs syndrome and thereby direct major genotoxicity. The correlative relationships described in this paper are confounded by many features of social disadvantage in Canada's northern territories. However, in the context of a similar broad spectrum of defects described both in animals and in epidemiological reports from Hawaii, Colorado, USA and Australia they are cause for particular concern and indicate further research.

2020 Reece and Hulse looked at Canadian Cannabis Consumption and Patterns of Congenital Anomalies: An Ecological Geospatial Analysis.
Cannabis is a known teratogen. Data availability addressing both major congenital anomalies and cannabis use allowed us to explore their geospatial relationships. METHODS:Data for the years 1998 to 2009 from Canada Health and Statistics Canada was analyzed in R. Maps have been drawn and odds ratios, principal component analysis, correlation matrices, least squares regression and geospatial regression analyses have been conducted using the R packages base, dplyr, epiR, psych, ggplot2, colorplaner and the spml and spreml functions from package splm.RESULTS:Mapping showed cannabis use was more common in the northern Territories of Canada in the Second National Survey of Cannabis Use 2018. Total congenital anomalies, all cardiovascular defects, orofacial clefts, Downs syndrome and gastroschisis were all found to be more common in these same regions and rose as a function of cannabis exposure. When Canada was dichotomized into high and low cannabis use zones by Provinces v Territories the Territories had a higher rate of total congenital anomalies 450.026 v 390.413 (O.R.=1.16 95%C.I. 1.08-1.25, P=0.000058; attributable fraction in exposed 13.25%, 95%C.I. 7.04-19.04%). In geospatial analysis in a spreml spatial error model cannabis was significant both alone as a main effect ($P<2.0\times10^{-16}$) and in all its first and second order interactions with both tobacco and opioids from $P<2.0\times10^{-16}$CONCLUSION:These results show that the northern Territories

of Canada share a higher rate of cannabis use together with elevated rates of total congenital anomalies, all cardiovascular defects, Down's syndrome and gastroschisis. This is the second report of a significant association between cannabis use and both total defects and all cardiovascular anomalies and the fourth published report of a link with Downs syndrome and thereby direct major genotoxicity. The correlative relationships described in this paper are confounded by many features of social disadvantage in Canada's northern territories. However, in the context of a similar broad spectrum of defects described both in animals and in epidemiological reports from Hawaii, Colorado, USA and Australia they are cause for particular concern and indicate further research.

2020 Prashad et al investigated sex-related differences in subjective but not neural, cue-elicitated craving response in heavy cannabis users. Studies indicate that female cannabis users progress through the milestones of cannabis use disorder (CUD) more quickly than male users, likely due to greater subjective craving response in women relative to men. While studies have reported sex-related differences in subjective craving, differences in neural response and the relative contributions of neural and behavioral response remain unclear. We examined sex-related differences in neural and behavioral response to cannabis cues and cannabis use measures in 112 heavy cannabis users (54 females). We used principal component analysis to determine the relative contributions of neural and behavioral response and cannabis use measures.Results We found that principal component (PC) 1, which accounts for the most variance in the dataset, was correlated with neural response to cannabis cues with no differences between male and female users ($p = 0.21$). PC2, which accounts for the second-most variance, was correlated with subjective craving such that female users exhibited greater subjective craving relative to male users ($p = 0.003$). We also found that CUD symptoms correlated with both PC1 and PC2, corroborating the relationship between craving and CUD severity. Conclusions These results indicate that neural activity primarily underlies response to cannabis cues and that a complex relationship characterizes a convergent neural response and a divergent subjective craving response that differs between the sexes. Accounting for these differences will increase efficacy of treatments through personalized approaches.

2020 Caulkins et al looked at the intensity of use in the findings of three online surveys. Drug use is often measured in terms of prevalence, meaning the number of people who used any amount in the last month or year, but measuring the quantity consumed is critical for making informed regulatory decisions and estimating the effects of policy changes. Quantity is the product of frequency (e.g., number of use days in the last month) and intensity (amount consumed per use day). Presently, there is imperfect understanding of the extent to which more frequent users also consume more intensively. Methods and data We examine cannabis flower consumption reported in three similar online surveys fielded in times and places where cannabis was and was not legal. These convenience samples returned enough valid responses ($n = 2,618$) to examine consumption across different frequencies of use via analyses of measures of central tendency, data visualizations, and multivariate regressions. Additional calculations incorporate data from the National Survey on Drug Use and Health. Findings. Respondents who reported using daily (i.e., 30 days in the past month) consumed almost twice as much per day of use on average as did those reporting less than daily. We find only modest increases in intensity among those using less than daily, but then a substantial increase ($p< 0.001$) for those who use daily. Most respondents report that on heavy or light use days their consumption differs from a typical day of use by a factor of 2 or more, but only about 25% of days were described as heavy or light. We estimate those using cannabis 21+ days a month account for 80% of consumption vs. 71% of the days of use.

2020 Silver et al investigated the Assessment of Incorporation of Lessons From Tobacco Control in City and County Laws Regulating Legal Marijuana in California. California legalized medical marijuana in 1996 and adult recreational use in 2016, effective in January 2018. A cross-sectional study with data collection and analysis from February 1 to November 30, 2019, measured the adoption of potential demand reduction and youth protection best practices, including restrictions on sales, products, marketing, warnings, and taxation. Laws in effect by January 31, 2019, were verified and all 539 California local jurisdictions were studied. **Main Outcomes and Measures** Adoption of potential best practices in marijuana laws for demand reduction and youth protection. **Results** The laws of 534 of California's 539 jurisdictions (99%) were successfully identified; 263 of these 534 jurisdictions (49%) allowed any retail sale of marijuana, covering 57% of the state's population. More than one-third of jurisdictions allow sales of marijuana for adult recreational use (203 of 534 [38%]); of those, 122 allow storefront dispensaries and 81 allow sales by delivery only. A total of 257 of 534 jurisdictions (48%) allow medical sales. Of 147 jurisdictions allowing medical or adult use dispensaries, 93 (63%) limited the number of licenses, with a mean of 1 store for every 19 058 residents (range, 154-355 143). The state imposed no limits on number of dispensaries or deliverers. Forty-two jurisdictions increased the state-specified distances required between dispensaries and schools.

Only 8 jurisdictions allowing retail sales imposed restrictions on products exceeding state regulations; 1 prohibited sale of flavored products, 3 prohibited sale of marijuana-infused beverages, and 5 imposed additional restrictions on edible marijuana products. No jurisdictions limited potency of products sold, although 1 established a potency-linked tax. The state did not limit or tax potency, except for establishing a standard 10-mg dose of tetrahydrocannabinol for edible marijuana products, nor did they limit manufacturing or sale of flavored products. The state required only a health warning in 6-point font on packages. Twenty-seven jurisdictions required additional health warnings in stores or on packages, 27 allowed onsite consumption of marijuana products, and 13 allowed marijuana-related events. More than half of jurisdictions legalizing any cannabis commerce (154 of 289 [53%]) did not tax marijuana locally and little revenue was captured for prevention. Much of the state excise and cultivation taxes is slated for youth substance use prevention and treatment. **Conclusions and Relevance** In implementing legalization of marijuana in California, local policies varied widely. Where marijuana was legalized, many lessons from tobacco control to reduce demand, limit harm, and prevent youth use were not adopted, potentially creating greater risk of harm.

2020 Hiller-Sturnhoefel found that parent's marijuana use may increase children's risk of marijuana use and favourable views of mariuana. This study found: Children's risk of marijuana and alcohol use and attitudes toward marijuana were influenced by their parents' marijuana use pattern over time. Children whose parents used marijuana primarily during adolescence/early adulthood and those whose parents continued to use marijuana from adolescence through adulthood were at highest risk

2020 Lancet: Organised Crime. The missing Link in Drug Policies. Illegal drugs and their effect on public health were discussed in a 2019 *Lancet* Series. However, the Series authors did not report how a global criminal enterprise, the drug–abuse industrial complex, is the origin of the problem. This global network of organised crime, corrupt politicians, money laundering, and distribution systems perpetuates this public health crisis. We have reason to believe the drug trade is now expanding under the guise of legal cannabis and cannabidiol, especially in North America, with outreach to other markets in South America, Europe, and Asia. The Dutch police released a report stating that the growth of organised crime is creating a narco-state. Drug policies should consider organised crime or they will be unable to address the prevention and reduction of both drug use and crimes related to drug use from the perspectives of both public health and law enforcement. The Netherlands has, in a sense, created the perfect environment for the drug trade to flourish. The country has an extensive transport network, lenient drug laws, and proximity to a number of lucrative markets.Thus, the Netherlands is an obvious hub for the flow of global narcotics. If health professionals, researchers, and policy makers choose to leave organised crime aside in the discussion, we will pay a heavy price. Organised crime is the cause of the drug-abuse crisis in society. Decades of drug policy have been limited by ignoring organised crime, and it should be included in future discussions on drug policy.

2020 Hasin et al looked at US adults with pain, a group increasingly vvulnerable to non-medical annabis use and cannabis use disorder 2001 – 2002 and 2012- Data from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC, 2001–2002; N=43,093) and NESARC-III (2012–2013; N=36,309) were analyzed using logistic regression. Risk differences of past-year nonmedical cannabis use, frequent (at least three times a week) nonmedical use, and DSM-IV cannabis use disorder were estimated for groups with and without moderate to severe pain, and these risk differences were tested for change over time. Results: Any nonmedical cannabis use was more prevalent in respondents with than without pain (2001–2002: 5.15% compared with 3.74%; 2012–2013: 12.42% compared with 9.02%), a risk difference significantly greater in the 2012–2013 data than in the 2001–2002 data. The prevalence of frequent nonmedical cannabis use did not differ by pain status in the 2001–2002 survey, but was significantly more prevalent in those with than without pain in the 2012–2013 survey (5.03% compared with 3.45%). Cannabis use disorder was more prevalent in respondents with than without pain (2001–2002: 1.77% compared with 1.35%; 2012–2013: 4.18% compared with 2.74%), a significantly greater risk difference in the data from 2012–2013 than from 2001–2002. Conclusions: The results suggest that adults with pain are a group increasingly vulnerable to adverse cannabis use outcomes, warranting clinical and public health attention to this risk. Psychiatrists and other health care providers treating patients with pain should monitor such patients for signs and symptoms of cannabis use disorder.

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