

MARIJUANA USE AND MENTAL ILLNESS AND BRAIN DAMAGE¹

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The Rise in Marijuana's THC Levels Contributes to the Mental Illness of Marijuana Users

An article published in the British Journal of Psychiatry states:

It is now incontrovertible that heavy use of cannabis increases the risk of psychosis. There is a dose-response relationship and high potency preparations and synthetic cannabinoids carry the greatest risk. ²

Marijuana products today can be up to 99% THC, the psychoactive chemical in marijuana. ³ The amount of THC in marijuana has been increasing steadily over the past few decades. The exposure to higher THC levels results in a greater chance of harmful reactions including mental illness. ⁴

The risk of negative mental health effects is increased about 5 times by regular use of high potency marijuana. ⁵ While a psychotic reaction can occur following any method of use, emergency room responders see an increasing number of cases involving marijuana edibles. Some people (especially preteens and teens) don't realize that it takes longer for the body to feel marijuana's effects when eaten rather than smoked. So they consume more of the edible, trying to get high faster or thinking they haven't taken enough. In addition, some babies and toddlers have been seriously ill after ingesting marijuana or marijuana edibles left around the house. ⁶

¹ For testimony and victim's stories on mental illness and marijuana please go to: <http://momsstrong.org>

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<https://www.readbyqxmd.com/read/29557759/cannabis-and-psychosis-what-do-we-know-and-what-should-we-do>

³ <https://herb.co/2017/03/29/thc-a-crystalline/>
<https://www.drugabuse.gov/publications/drugfacts/marijuana>

⁴ <https://www.drugabuse.gov/publications/drugfacts/marijuana>

⁵ Di Forti M, Marconi A, Carra E, Fraietta S, Trotta A, Bonomo M, Bianconi F, Gardner-Sood P, O'Connor J, Russo M, Stilo SA, Marques TR, Mondelli V, Dazzan P, Pariante C, David AS, Gaughran F, Atakan Z, Iyegbe C, Powell J, Morgan C, Lynskey M, Murray RM. Proportion of patients in south London with first-episode psychosis attributable to use of high potency cannabis: a case-control study. *Lancet Psychiatry*. 2015;2(3):233-238.

⁶ <https://www.drugabuse.gov/publications/drugfacts/marijuana> August 2017

This risk applies to “medical” marijuana use also. ⁷

The rise in mental health issues matches the rise in marijuana use

Dr. Stuart Reece has compared the data from 2008 to 2017 from the National Survey on Drug Use and Health (NSDUH). NSDUH measures the use of illegal drugs, prescription drugs, alcohol, and tobacco mental disorders, treatment, and co-occurring substance use and mental disorders. The data provides estimates of substance use and mental illness at the national, state, and sub-state levels. NSDUH data also help to identify the extent of substance use and mental illness among different sub-groups, estimate trends over time, and determine the need for treatment services.

Dr. Reece notes that:

The rise in cannabis monthly use was associated with a rise in cannabis initiation, cocaine initiation and heroin use disorder – consistent with the widely recognized gateway effect of cannabis.

The 33% rise in monthly cannabis use in 18-25 years group was associated with disproportionate rises in all seven classes of mental illness which are tracked:

39% for any mental illness

56% for major depressive episode

63% for major depressive episode with severe impairment

97% for serious mental illness

54% for suicidal thoughts

85% for suicidal plans

58% for suicidal actions ⁸

Young people and marijuana use

Based on recent studies we know the following regarding young people and marijuana use:

Young people with marijuana dependence have altered brain function that may be the source of emotional disturbances and increased psychosis risk that are associated with marijuana abuse. The alterations were most pronounced in people who started using marijuana at a young age. The findings reveal potential negative long-term effects of heavy marijuana use on brain function and

⁷ Edgar Ross, MD “Discourage the Use of Medical Marijuana” Department of Anesthesia, Perioperative and Pain Medicine, Brigham and Women's Hospital, and Harvard Medical School, N ENGL J 379:16 NEJM.ORG October 18, 2018

⁸ Dr. Reece has a great deal of information on this subject. He is listed as one of our experts. Dr A. Stuart Reece, 39 Gladstone Rd., Highgate Hill, Brisbane, Queensland, Australia, 4101. Email: asreece@bigpond.net.au or stuart.reece@bigpond.net.au

behavior.⁹

Marijuana use during adolescence can cause functional and structural changes to the developing brain, leading to damage. Marijuana use in this age group is strongly linked to: an increased presence of mental illness, including depression, anxiety and psychosis; impaired neurological development and cognitive decline; and diminished school performance and lifetime achievement.¹⁰

Mental illnesses caused by marijuana use

Psychosis and Schizophrenia

Marijuana use can trigger psychotic symptoms (from observable clinical studies of purified THC) in 40% of people with no family history of psychosis.¹¹ Regular recreational marijuana users had psychotic disorders at a greater rate than any other recreational drug. More than cocaine,

⁹ <https://www.drugabuse.gov/publications/drugfacts/marijuana> August 2017

¹⁰ Paediatr Child Health. 2017 May;22(2):98-102. doi: 10.1093/pch/pxx017. Epub 2017 May 3. Cannabis and Canada's children and youth. <https://www.ncbi.nlm.nih.gov/pubmed/29480902>

<https://www.news-medical.net/news/20180116/Study-reveals-negative-long-term-effects-of-heavy-cannabis-use-on-brain-function-and-behavior.aspx>

<https://www.usatoday.com/story/news/nation-now/2018/10/06/marijuana-damaged-teenagers-brains-more-than-alcohol-study-finds/1539574002/>

¹¹ Bhattacharyya S, Crippa JA, Allen P, Martin-Santos R, Borgwardt S, Fusar-Poli P, Rubia K, Kambeitz J, O'Carroll C, Seal ML, Giampietro V, Brammer M, Zuardi AW, Atakan Z, McGuire PK. Induction of psychosis by Δ 9-tetrahydrocannabinol reflects modulation of prefrontal and striatal function during attentional salience processing. Arch Gen Psychiatry. 2012; 69(1):27-36.

Morrison PD, Nottage J, Stone JM, Bhattacharyya S, Tunstall N, Brenneisen R, Holt D, Wilson D, Sumich A, McGuire P, Murray RM, Kapur S, Ffytche DH. Disruption of frontal θ coherence by Δ 9-tetrahydrocannabinol is associated with positive psychotic symptoms. Neuropsychopharmacology. 2011; 36(4):827-836.

Cannabis, a Significant Risk Factor for Violent Behavior in the Early Phase Psychosis. Two Patterns of Interaction of Factors Increase the Risk of Violent Behavior: Cannabis Use Disorder and Impulsivity; Cannabis Use Disorder, Lack of Insight and Treatment Adherence. <https://www.ncbi.nlm.nih.gov/pubmed/30022956>

Proportion of patients in south London with first-episode psychosis attributable to use of high potency cannabis: a case-control study Marta Di Forti, Arianna Marconi, Elena Carra, Sara Fraietta, http://www.thelancet.com/pb/assets/raw/Lancet/pdfs/14TLP0454_Di%20Forti.pdf

Cannabis-induced psychosis on the rise in N.W.T. prior to legalization, says health dept. CBC News <https://www.cbc.ca/news/canada/north/cannabis-psychosis-hospitalizations-increased-1.4877853>

methamphetamine, amphetamine, LSD, PCP, or alcohol. ¹²

A study discussed in a 2017 article in Scientific American shows that people who had consumed marijuana before age 18 developed schizophrenia approximately 10 years earlier than others. The higher the frequency of use the earlier the age of schizophrenia onset. Neither alcohol use nor genetics predicted an earlier time of inception, but marijuana did. Marijuana use during puberty is a major risk factor for schizophrenia. The more marijuana you take - and the higher the potency - the greater the risk. ¹³

A recent survey of the elements illustrating marijuana as a causal factor for psychosis was published in the journal Addiction. ¹⁴

Suicide

The risk for suicide attempts has been shown to be increased 7 times in regular marijuana users, ¹⁵ and for completed suicides an increase as high as 5 times. ¹⁶

¹² Niemi-Pynttari JA, Sund R, Putkonen H, Vormaa H, Wahlbeck K, Pirkola SP. Substance-induced psychoses converting into schizophrenia: a register-based study of 18,478 Finnish inpatient cases. *J Clin Psychiatry*, 2013; 74(1): e94-9.

"Anterior Cingulate Grey-Matter Deficits and Cannabis Use in First-Episode Schizophrenia" - The British Journal of Psychiatry, 2007; 190: 230-236

"Cannabis-Related Schizophrenia Set to Rise, Say Researchers" - Science Daily, 26 March 2007

Nielsen, S. M., Toftdahl, N. G., Nordentoft, M., & Hjorthøj, C. Association between alcohol, cannabis, and other illicit substance abuse and risk of developing schizophrenia: a nationwide population based register study. *Psychological Medicine*, 2017; 47(9):1668-1677.

Starzer MSK, Nordentoft M, Hjorthøj C. Rates and Predictors of Conversion to Schizophrenia or Bipolar Disorder Following Substance-Induced Psychosis. *Am J Psychiatry*, 2018; 175(4): 343-350.

¹³

<https://www.scientificamerican.com/article/link-between-adolescent-pot-smoking-and-psychosis-strengthens/>

¹⁴ Miller CL. The disconnect between the science on cannabis and public health campaigns. *Addiction*. 2017;112(10):1882-1883.

<https://onlinelibrary.wiley.com/doi/full/10.1111/add.13918>

¹⁵ Risk

Clarke MC, Coughlan H, Harley M, Connor D, Power E, Lynch F, Fitzpatrick C, Cannon M. The impact of adolescent cannabis use, mood disorder and lack of education on attempted suicide in young adulthood. *World Psychiatry*. 2014;13(3):322-323.

Silins E, Horwood LJ, Patton GC, Fergusson DM, Olsson CA, Hutchinson DM, Spry E, Toumbourou JW, Degenhardt L, Swift W, Coffey C, Tait RJ, Letcher P, Copeland J, Mattick RP, for the Cannabis Cohorts Research

Marijuana is the Number 1 substance now found in suicides of young people in Colorado who are 10-19 years old. ¹⁷

Depression

Identical twin studies have demonstrated a clear impact that increases depression 2 times in the twin who uses marijuana. ¹⁸

Bi-polar Disorder

A large longitudinal study showed a increased risk for symptoms of bipolar disorder. ¹⁹

Post Traumatic Stress Disorder

PTSD patients who used marijuana users were found to make less progress in overcoming their condition and were more likely to become violent. ²⁰

Consortium. Young adult sequelae of adolescent cannabis use: an integrative analysis. *Lancet Psychiatry* 2014; 1(4): 245-318.

¹⁶ Completed

Arendt M, Munk-Jørgensen P, Sher L, Jensen SO. Mortality following treatment for cannabis use disorders: predictors and causes. *J Subst Abuse Treat.* 2013;44(4):400-406.

See also: Clarke MC, Coughlan H, Harley M, Connor D, Power E, Lynch F, Fitzpatrick C, Cannon M. The impact of adolescent cannabis use, mood disorder and lack of education on attempted suicide in young adulthood. *World Psychiatry.* 2014;13(3):322-3.

¹⁷ Go to the below Colorado website and click on the box that lists “methods, circumstances and toxicology” and then click on the two boxes for 10-19 years olds. The marijuana data will appear.

https://cohealthviz.dphe.state.co.us/t/HSEBPublic/views/CoVDRS_12_1_17/Story1?:embed=y&:showAppBanner=false&:showShareOptions=true&:display_count=no&:showVizHome=no#4

¹⁸ Agrawal A, Nelson EC, Bucholz KK, Tillman R, Grucza RA, Statham DJ, ... Lynskey MT. Major depressive disorder, suicidal thoughts and behaviours, and cannabis involvement in discordant twins: a retrospective cohort study. *The Lancet Psychiatry,* 2017; S2215-0366(17)30280-8.

¹⁹ <http://www.newswise.com/articles/view/685947/?sc=dwtm>

²⁰ Wilkinson ST, Stefanovics E, Rosenheck RA. Marijuana use is associated with worse outcomes in symptom severity and violent behavior in patients with posttraumatic stress disorder. *J Clin Psychiatry.* 2015;76(9):1174-1180.

Anxiety

Marijuana use causes anxiety.²¹

Mental ability

Impacts on mental ability are obvious when a person is intoxicated, however, longitudinal MRI studies and other studies show the changes extend well beyond the time period of obvious impairment.²²

Loss of IQ

A study from New Zealand conducted in part by researchers at Duke University showed that

²¹ Wolitzky-Taylor K, Bobova L, Zinbarg RE, Mineka S, Craske MG., Longitudinal Investigation of the Impact of Anxiety and Mood Disorders in Adolescence on Subsequent Substance Use Disorder Onset and Vice Versa. *Addict Behav.* 2012 Aug;37(8):982-5
<https://www.drugabuse.gov/publications/drugfacts/marijuana> August 2017

Health Effects of Cannabis and Cannabinoids: Current State of Evidence and Recommendations for Research. See: <http://nationalacademies.org/hmd/~media/Files/Report%20Files/2017/Cannabis-Health-Effects/Cannabis-chapter-highlights.pdf>

Paediatr Child Health. 2017 May;22(2):98-102. doi: 10.1093/pch/pxx017. Epub 2017 May 3.
Cannabis and Canada's children and youth. <https://www.ncbi.nlm.nih.gov/pubmed/29480902>

²² Cannabis Use Mimics Cognitive Weakness That Can Lead to Schizophrenia, MRI Study Finds, *Science Daily*, November 2, 2012,
<http://www.sciencedaily.com/releases/2012/11/121102084632.htm>

Camchong J, Lim KO, Kumra S. Adverse Effects of Cannabis on Adolescent Brain Development: A Longitudinal Study. *Cereb Cortex.* 2017 Mar 1;27(3):1922-1930.

Marijuana caused more damage to teens' brains than alcohol, study finds: USA Today Network, Joel Shannon,
<https://www.usatoday.com/story/news/nation-now/2018/10/06/marijuana-damaged-teenagers-brains-more-than-alcohol-study-finds/1539574002/>

Meier MH, Caspi A, Ambler A, Harrington H, Houts R, Keefe RS, McDonald K, Ward A, Poulton R, Moffitt TE. Persistent cannabis users show neuropsychological decline from childhood to midlife. *Proc Natl Acad Sci U S A.* 2012 Oct 2;109(40):E2657-2664.

Cannabis and Schizophrenia a Longitudinal Study of Swedish Conscripts
http://www.thelancet.com/pb/assets/raw/Lancet/pdfs/14TLP0454_Di%20Forti.pdf

people who started smoking marijuana heavily in their teens and had an ongoing marijuana use disorder lost an average of 8 IQ points between ages 13 and 38. The lost mental abilities didn't fully return in those who quit marijuana as adults.²³
Addiction

The National Institute on Drug Abuse (NIDA) research shows that up to 30 percent of marijuana users may develop some degree of problem use that can include addiction.²⁴

Opiate Disorder

Recent research shows that marijuana use is associated with an increased risk of prescription and Opioid misuse disorders.²⁵

Scientific Organization Reports

The 2016 United States Surgeon General report on addiction states that marijuana is a serious threat to the physical and mental health of our children and that its use is a major threat to public safety.²⁶

²³ <https://www.drugabuse.gov/publications/drugfacts/marijuana>

See also:

The Occurrence of Cannabis Use Disorders and Other Cannabis Related Problems Among First Year College Students, Addictive Behaviors 33(3):397-411, March 2008.

"Regular or Heavy Use of Cannabis Was Associated with Increased Risk of Using Other Illicit Drugs" - Addiction, 2006; 101:556-569

"As Marijuana Use Rises, More People Are Seeking Treatment for Addiction" - Wall Street Journal, 2 May 2006

"Twenty-Five Year Longitudinal Study Affirms Link Between Marijuana Use and Other Illicit Drug Use" - Congress of the United States, 14 March 2006

"New Study Reveals Marijuana is Addictive and Users Who Quit Experience Withdrawal"
- All Headline News, 6 February 2007

"Cannabis Withdrawal Among Non-Treatment-Seeking Adult Cannabis Users" - The American Journal on Addiction, 2006; 15:8-14

²⁴ <https://www.drugabuse.gov/publications/drugfacts/marijuana>

²⁵ <https://www.drugabuse.gov/news-events/news-releases/2017/09/marijuana-use-associated-increased-risk-prescription-opioid-misuse-use-disorders>

²⁶ Facing Addiction in America: The Surgeon General's Report on Alcohol, Drugs, and Health, November, 2016, Chapters One and two and Appendix D pp.65-66 at:

The American Psychiatric Association reports that current evidence supports, at a minimum, a strong association of marijuana use with the onset of psychiatric disorders. “Adolescents are particularly vulnerable to harm, given the effects of cannabis on neurological development.”²⁷

The National Institute on Drug Abuse (NIDA) research shows that up to 30 percent of marijuana users may develop some degree of problem use that can include addiction. Among young users, the drug may reduce thinking, memory, and learning functions. Marijuana use has also been linked to mental health problems, such as depression, anxiety, and suicidal thoughts among teens.²⁸

In 2017, the National Academy of Sciences (NAS) landmark report written by top scientists concluded after a review of over 10,000 peer-reviewed academic articles, that marijuana use is connected to, among other problems such as mental health issues (like psychosis, social anxiety, and thoughts of suicide) and learning, memory, and attention loss (possibly permanent in some cases).²⁹

The United Nation Office on Drug and Crime had this to say about marijuana use and damage to mental health

Although it is often seen as a less harmful drug, cannabis use poses several health risks. Even when used only once, cannabis may lead to panic attacks, paranoia, psychotic symptoms and other negative acute effects. The drug may also precipitate psychosis in vulnerable individuals and intensify symptoms in diagnosed schizophrenics.³⁰

Testimony before Congress

In her testimony entitled “Cannabis and Medicinal Properties” before the Crime and Terrorism Subcommittee of the U.S. Senate Committee on the Judiciary in 2016, Bertha K Madras, PhD, Professor of Psychobiology, Department of Psychiatry, Harvard Medical School noted that:

<https://addiction.surgeongeneral.gov/surgeon-generals-report.pdf>

²⁷ American Psychiatric Association, 2013 “Position Statement on Marijuana as Medicine,” paragraph 1 found at: <https://www.psychiatry.org/home/policy-finder>

²⁸ <https://www.drugabuse.gov/publications/drugfacts/marijuana>

²⁹ Health Effects of Cannabis and Cannabinoids: Current State of Evidence and Recommendations for Research. See: <http://nationalacademies.org/hmd/~media/Files/Report%20Files/2017/Cannabis-Health-Effects/Cannabis-chapter-highlights.pdf>

³⁰ See Why should we care about cannabis? April 28, 2008, <http://www.unodc.org/unodc/en/frontpage/why-should-we-care-about-cannabis.html>.

1. There was an association of marijuana with psychosis and schizophrenia.
2. There is increased risk for cognitive decline.
3. There is increased risk of psychosocial impairment.
4. There is increased risk for psychiatric symptoms.³¹

THC Medicines

Marinol, an FDA approved artificial THC medicine has a warning about mental illness and its use. Marinol is used to treat loss of appetite (anorexia) in people with AIDS (Acquired Immune Deficiency Syndrome) who have lost weight and nausea and vomiting caused by anti-cancer medicine (chemotherapy) in people whose nausea and vomiting have not improved with usual anti-nausea medicines. Marinol can cause serious side effects, including: worsening of mental (psychiatric) symptoms in people who have mania, depression, or schizophrenia. Problems thinking clearly.³²

Conclusion

There is no doubt anymore that marijuana use causes or contributes to many forms of mental illness and neurological problems.³³

³¹ Cannabis and Medicinal Properties, Bertha K Madras, PhD, Professor of Psychobiology, Department of Psychiatry, Harvard Medical School, hearing before the Crime and Terrorism Subcommittee of the U.S. Senate Committee on the Judiciary Scheduled for July 13, 2016. This is an abbreviated version of a report written by the author and commissioned by the World Health Organization: Update of Cannabis and its Medical Use December 2015. http://www.who.int/medicines/access/controlled-substances/6_2_cannabis_update.pdf. Components of this article were incorporated into a WHO report: The Health and Social Effects of nonmedical cannabis use, April 2016 http://www.who.int/substance_abuse/publications/cannabis/en/from_400_to_650.214.15

³² <http://www.marinol.com>

³³ A risk gene for cannabis psychosis, Science Daily, November 14, 2012 <http://www.sciencedaily.com/releases/2012/11/121114083928.htm>

Abbie Crites-Leoni, Medicinal Use of Marijuana: Is the Debate a Smoke Screen for Movement Toward Legalization?, 19 J. Legal Med. 273, 280 (1998) (citing Schwartz, et al., Short-Term Memory Impairment in Cannabis-Dependent Adolescents, 143 Am. J. Dis. Child. 1214 (1989)).

Adolescent pot use leaves lasting mental deficits, Developing brain susceptible to lasting damage from exposure to marijuana. Science Daily, August 27, 2012, <http://www.sciencedaily.com/releases/2012/08/120827152039.htm>

Arendt M, Munk-Jørgensen P, Sher L, Jensen SO. Mortality following treatment for cannabis use disorders: predictors and causes. J Subst Abuse Treat. 2013;44(4):400-6.

Arseneault L, Moffitt TE, Caspi A, Taylor PJ, Silva PA. Mental disorders and violence in a total birth cohort: results from the Dunedin Study. Arch Gen Psychiatry. 2000;57(10):979-86.

Association with schizophrenia and other psychotic disorders such as bipolar and schizophrenia. (Miller, 2017;

Cogle et al., 2015), completed suicides and suicide attempts (Arendt et al., 2013; Silins et al., 2014; Clarke et al., 2014) and violence towards others (Arseneault et al., 2000; Dugre et al., 2017; Harford et al., 2018) particularly in those who develop marijuana-induced psychosis.

Barrigón, M. Ruiz-Veguilla, M. Anguita, F.J. Diaz, J. Cervilla, M. Gurpegui. Temporal relationship of cannabis and other illegal drug use with the onset of first-episode non-affective psychosis. *Schizophrenia Research*, 2008; 98(2):66

Cannabis Use Mimics Cognitive Weakness That Can Lead to Schizophrenia, MRI Study Finds, Science Daily, November 2, 2012, <http://www.sciencedaily.com/releases/2012/11/121102084632.htm>

Cannabis use precedes the onset of psychotic symptoms in young people, study finds, Science Daily, March 3, 2011, <http://www.sciencedaily.com/releases/2011/03/110301184056.htm>

Cannabis-Related Schizophrenia Set to Rise, Say Researchers, Science Daily, 26 March 2007, <http://www.sciencedaily.com/releases/2007/03/070324132832.htm>

Cheng, M., Report: Using Pot May Heighten Risk of Becoming Psychotic, Associated Press, 26 July 2007

Cogle JR et al. (2015). Quality of life and risk of psychiatric disorders among regular users of alcohol, nicotine, and cannabis: An analysis of the National Epidemiological Survey on Alcohol and Related Conditions (NESARC). *J Psychiatr Res.*, 66-67, 135-141

Curtis, John. Study Suggests Marijuana Induces Temporary Schizophrenia-Like Effects. *Yale Medicine*. Fall/Winter 2004, <http://yalemedicine.yale.edu/fw2004/news/rou>

Daily Pot Smoking May Hasten Onset of Psychosis, Science Daily, December 21, 2009, <http://www.sciencedaily.com/releases/2009/12/091220144936.htm>

Daily Consumption Of Cannabis Predisposes To Appearance Of Psychosis And Schizophrenia, Study Finds, Science Daily, March 26, 2009, <http://www.sciencedaily.com/releases/2009/03/090325132328.htm>

Di Forti M, et al. Proportion of patients in South London with first-episode psychosis attributable to use of high potency cannabis: a case-control study. *Lancet Psychiatry*. 2015;2(3):233-8.

Dugré JR, Dellazizzo L, Giguère CÉ, Potvin S, Dumais A. Persistency of Cannabis Use Predicts Violence following Acute Psychiatric Discharge. *Front Psychiatry*. 2017 21;8:176. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5613094/pdf/fpsyt-08-00176.pdf>

Fratta W, Fattore L., Molecular Mechanisms of Cannabinoid Addiction. *Curr Opin Neurobiol*. 2013 Aug;23(4):487-92

Harford TC, Chen CM, Kerridge BT, Grant BF. Self- and other-directed forms of violence and their relationship with lifetime DSM-5 psychiatric disorders: Results from the National Epidemiologic Survey on Alcohol Related Conditions-III (NESARC-III). *Psychiatry Res*. 2018;262:384-392.

How marijuana impairs memory, Science Daily, March 1, 2012, www.sciencedaily.com/releases/2012/03/120301143424.htm

J. van Os, M. Bak, M. Hanssen, R. V. Bijl, R. de Graaf, and H. Verdoux, Cannabis Use and Psychosis: A

Longitudinal Population-based Study, *Am. J. Epidemiol.* (2002) 156 (4): 319-327

Jing Han, Philip Kesner, Mathilde Metna-Laurent, Tingting Duan, Lin Xu, Francois Georges, Muriel Koehl, Djoher Nora Abrous, Juan Mendizabal-Zubiaga, Pedro Grandes, Qingsong Liu, Guang Bai, Wei Wang, Lize Xiong, Wei Ren, Giovanni Marsicano. Acute Cannabinoids Impair Working Memory through Astroglial CB1 Receptor Modulation of Hippocampal LTD. *Cell*, 2012, Volume 148, Issue 5, 2 March 2012, Pages 1039-1050

John McGrath; Joy Welham; James Scott; Daniel Varghese; Louisa Degenhardt; Mohammad Reza Hayatbakhsh; Rosa Alati; Gail M. Williams; William Bor; Jake M. Najman. Association Between Cannabis Use and Psychosis-Related Outcomes Using Sibling Pair Analysis in a Cohort of Young Adults. *Arch Gen Psychiatry*, 2010; 67(5):440-447

Long-time cannabis use associated with psychosis, *Science Daily*, March 2, 2010
<http://www.sciencedaily.com/releases/2010/03/100301165726.htm>

Malchow B, Hasan A, Fusar-Poli P, Schmitt A, Falkai P, Wobrock T., Cannabis Abuse and Brain Morphology in Schizophrenia: a Review of the Available Evidence. *Eur Arch Psychiatry Clin Neurosci*. 2013 Feb 263(1):3-13

Marijuana Linked to Schizophrenia, Depression - British Medical Journal, 21 November 2007

Marijuana Increases the Risk of Both Psychosis In Non-Psychotic People As Well As Poor Prognosis For Those With Risk of Vulnerability to Psychoses - American Journal of Epidemiology, 2002; 156:319-327

Marta Di Forti, Conrad Iyegbe, Hannah Sallis, Anna Kolliakou, M. Aurora Falcone, Alessandra Paparelli, Miriam Sirianni, Caterina La Cascia, Simona A. Stilo, Tiago Reis Marques, Rowena Handley, Valeria Mondelli, Paola Dazzan, Carmine Pariante, Anthony S. David, Craig Morgan, John Powell, Robin M. Murray. Confirmation that the AKT1 (rs2494732) Genotype Influences the Risk of Psychosis in Cannabis Users. *Biological Psychiatry*, 2012; 72 (10): 811

Matthew Large; Swapnil Sharma; Michael T. Compton; Tim Slade; Olav Nielssen. Cannabis Use and Earlier Onset of Psychosis: A Systematic Meta-analysis. *Arch Gen Psychiatry*. 2011; 68(6):555-561

Miguel Ruiz-Veguilla, Manuel Gurpegui, María Luisa Barrigón, Maite Ferrín, Esther Marín, Jos, Luis Rubio, Blanca Gutierrez, Antonio Pintor, Jorge Cervilla. Fewer neurological soft signs among first episode psychosis patients with heavy cannabis use. *Schizophrenia Research*, 2009; 107(2-3): 158,
<http://www.sciencedirect.com/science/article/pii/S0920996408003472>

Miguel Ruiz-Veguilla, Jorge A. Cervilla, María Luisa Barrigón, Maite Ferrín, Blanca Gutiérrez, Estibaliz Gordoc Manuel Anguita, Antía Brañas, Jesús Fernández-Logroño, Manuel Gurpegui. Neurodevelopmental markers in different psychopathological dimensions of first episode psychosis: The ESPIGAS Study. *European Psychiatry*, 2008; 23(8): 533, <http://www.sciencedirect.com/science/article/pii/S0924933808015307>

Miller CL. The disconnect between the science on cannabis and public health campaigns. *Addiction*. 2017; 112(10):1882-1883. <https://onlinelibrary.wiley.com/doi/epdf/10.1111/add.13918>

Ottens R, Barker ED, Maughan B, Arseneault L, Engels RC., Self-Control and Its Relation to Joint Developmental Trajectories of Cannabis Use and Depressive Mood Symptoms. *Drug Alcohol Depend*. 2010 Dec 1; 112(3):201-8

Philip R. Szeszko, Delbert G. Robinson, Serge Sevy, Sanjiv Kumra, Claudia I. Rupp, Julia D. Betensky, Todd Lencz, Manzar Ashtari, John M. Kane, Anil K. Malhotra, Handan Gunduz-Bruce, Barbara Napolitano, Robert M.

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Bilder, Anterior Cingulate Grey-Matter Deficits and Cannabis Use in First-Episode Schizophrenia. *The British Journal of Psychiatry*, 2007; 190 (3) 230-236

Psychophysiological Evidence of Altered Neural Synchronization in Cannabis Use: Relationship to Schizotypy - *Am J Psychiatry*, 2006; 163:1798-1805

Psychotic illness appears to begin at younger age among those who use cannabis, *Science Daily* February 8, 2011 <http://www.sciencedaily.com/releases/2011/02/110207165434.htm>

Rebecca Kuepper, research psychologist, Jim van Os, professor, visiting professor, Roselind Lieb, professor, Hans-Ulrich Wittchen, professor, Michael Höfler, research statistician, Cécile Henquet, lecturer. Continued cannabis use and risk of incidence and persistence of psychotic symptoms: 10 year follow-up cohort study, *BMJ* 2011; 342:d738, <http://www.bmj.com/content/342/bmj.d738>

Schizophrenia and cannabis use may share common genes, *Science Daily*, June 24, 2014, <http://www.sciencedaily.com/releases/2014/06/140624093320.htm>

Silins E, Horwood LJ, Patton GC, Fergusson DM, Olsson CA, Hutchinson DM, Spry E, Toumbourou JW, Degenhardt L, Swift W, Coffey C, Tait RJ, Letcher P, Copeland J, Mattick RP, for the Cannabis Cohorts Research Consortium. Young adult sequelae of adolescent cannabis use: an integrative analysis. *Lancet Psychiatry* 2014; 1(4): 245-318.

Skosnik PD1, Krishnan GP, Ayt EE, Kuhlensmidt HA, O'Donnell BF, Psychophysiological Evidence of Altered Neural Synchronization in Cannabis Use: Relationship to Schizotypy, *Am J Psychiatry*, 2006; 163(10):1798-1805

Starzer MSK, Nordentoft M, Hjorthøj C. (2018) Rates and Predictors of Conversion to Schizophrenia or Bipolar Disorder Following Substance-Induced Psychosis. *Am J Psychiatry*, 175(4), 343-350

Stefanis NC, Dragovic M, Power BD, Jablensky A, Castle D, Morgan VA. Age at Initiation of Cannabis Use Predicts Age at Onset of Psychosis: The 7 to 8 year Trend, *Schizophrenia Bulletin*, (2013) Mar 39(2):251-4

Wayne Hall & Louisa Degenhardt. Cannabis and the increased incidence and persistence of psychosis. *BMJ* 2011; 342:d719, <http://www.bmj.com/content/342/bmj.d719>

Wolitzky-Taylor K, Bobova L, Zinbarg RE, Mineka S, Craske MG., Longitudinal Investigation of the Impact of Anxiety and Mood Disorders in Adolescence on Subsequent Substance Use Disorder Onset and Vice Versa. *Addict Behav.* 2012 Aug;37(8):982-5

of Health. He analyzed legal and regulatory requirements regarding: drug and alcohol abuse, research and data collection, courts, criminal justice, domestic violence, drug-free workplaces, juveniles, confidentiality, treatment, drug testing, AIDS, drug use forecasting, and discrimination.

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