Hb1147 – **Favorable**

Public Health – Cannabis Programs – Cannabis–Induced Psychosis and THC Concentration Limit

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The Impact of Marijuana on Mental Health, Oxford University Press, 2018
Marijuana and Suicide, Springer Press, 2020

Oral Testimony:

1. Three years ago, I sat in on a meeting in Senator West's office with William Tilburg, the Director of Maryland's Medical Cannabis program, and a mom who was pleading for help to get her adult son's medical cannabis card taken away. He had developed cannabis-induced psychosis, requiring hospitalization. He resumed using after discharge, continued to have psychotic episodes and it became impossible for him to function as a music teacher. Mr. Tilburg informed her that he didn't think there was a mechanism to block her son's purchases, but he would try to help and let her know. She never heard back. This bill would provide the mechanism needed then and now.

2. Fo r those who don't believe cannabis is causal for psychosis, the evidence is overwhelming when the Bradford-Hill analysis of causation is applied. And unlike mental impairment by alcohol, predictable based on body weight and gender, for cannabis you can't predict who is likely to be safe in advance. These and other points that follow are all backed up with science in my written testimony.

3. Individuals who develop this disorder are much more likely to recover if they stop using, but if their use persists after the first psychotic break, the chances become 50:50 for eventually developing permanent psychosis, as is now the case for that mom's son, tragic and expensive for families and society. Blocking their purchases would be their much-needed wakeup call.

4. Those who continue to use are not only a danger to themselves, but can also be a danger to others.

5. You may ask, why set the concentration cap at 15%? It's estimated to be the average for cannabis buds sold on the street, the product most voters were likely thinking of as there was no mention of potent concentrates in the ballot. 15% is not always safe, but it's much safer than concentrates in the short term. From other states, we know it's better to have these restrictions in place from the outset.

6. You may hear these provisions will cause users to turn to the black market, but if we allow them to dictate what's OK, we're doomed. They sell to kids.

7. You may hear identifying cannabis-induced psychosis patients will violate privacy laws, but there are mechanisms to avoid that. HHS, which oversees HIPAA laws, states communication between medical and other entities is allowed if it is in the best interest of the affected individual. There is precedence for this in the PDMP program in Maryland, and a mechanism that would be easy to apply.

8. You may hear that alcohol abuse causes chronic psychoses too, but it does so at 1/9th the rate, is milder, and with a peak onset much later in life, whereas that caused by cannabis is something an individual may live with for most of their life.

Full references for oral testimony and additional information on mechanisms for applying provisions of the bill:

"**For those who don't believe cannabis is causal for psychosis, the evidence is overwhelming when the Bradford-Hill analysis of causation is applied**."

As published in the website for the International Academy on the Science and Impact of Cannabis, with editorial oversight from the prominent schizophrenia epidemiologist Dr. Carsten Hjorthoj of Denmark: https://iasic1.org/wp-content/uploads/2021/06/2.-Applying-the-Bradford-Hill-Elements-of-Causation-to-Cannabis-causing-psychosis-Edition-2-6-4-21-1.pdf

"unlike mental impairment by alcohol, predictable based on body weight and gender, you can't predict with cannabis"

When a moderate dose of pure THC is administered in the clinic, subjects without a family history of psychosis can develop psychotic symptoms during the course of the day (D'Souza et al., 2004; Morrison et al., 2011; Freeman et al., 2015); 40% will do so according to Morrison et al. (2011). Of those with such "prodromal" symptoms, 35% would progress to a full psychotic break if they kept using (Cannon et al., 2008), and then nearly 50% would go on to develop schizophrenia (Niemi-Pynttari et al., 2013; Starzer et al., 2018), and that conversion was found to be independent of family history (Arendt et al., 2008):

Arendt M, Mortensen PB, Rosenberg R, Pedersen CB, Waltoft BL. Familial predisposition for psychiatric disorder: comparison of subjects treated for cannabis-induced psychosis and schizophrenia. Arch Gen Psychiatry. 2008;65(11):1269-74. http://archpsyc.ama-assn.org/cgi/reprint/65/11/1269

Cannon TD, Cadenhead K, Cornblatt B, Woods SW, Addington J, Walker E, Seidman LJ, Perkins D, Tsuang M, McGlashan T, Heinssen R. Prediction of psychosis in youth at high clinical risk: a multisite longitudinal study in North America. Arch Gen Psychiatry. 2008 Jan;65(1):28-37. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3065347/pdf/nihms277230.pdf

D'Souza DC, Perry E, MacDougall L, Ammerman Y, Cooper T, Wu YT, Braley G, Gueorguieva R, Krystal JH. The psychotomimetic effects of intravenous delta-9-tetrahydrocannabinol in healthy individuals: implications for psychosis. Neuropsychopharmacology. 2004 Aug;29(8):1558-72. https://www.nature.com/articles/1300496.pdf

Freeman D, Dunn G, Murray RM, Evans N, Lister R, Antley A, Slater M, Godlewska B, Cornish R, Williams J, Di Simplicio M, Igoumenou A, Brenneisen R, Tunbridge EM, Harrison PJ, Harmer CJ, Cowen P, Morrison PD. How cannabis causes paranoia: using the intravenous administration of Δ9-tetrahydrocannabinol (THC) to identify key cognitive mechanisms leading to paranoia. Schizophr Bull. 2015;41(2):391-9. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4332941/pdf/sbu098.pdf

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 Δ9-tetrahydrocannabinol is associated with positive psychotic symptoms. Neuropsychopharmacology. 2011; 36(4):827-36. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3055738/pdf/npp2010222a.pdf

Niemi-Pynttäri JA, Sund R, Putkonen H, Vorma 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. https://www.psychiatrist.com/jcp/article/Pages/2013/v74n01/v74n0115.aspx

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. https://ajp.psychiatryonline.org/doi/abs/10.1176/appi.ajp.2017.17020223?rfr_dat=cr_pub%3Dpubmed&url_ver=Z39.88-2003&rfr_id=ori%3Arid%3Acrossref.org&journalCode=ajp

"**Individuals who develop this disorder are much more likely to recover if they stop using**" (and not being able to purchase at a dispensary may be the wake up call they need)
González-Pinto A, Alberich S, Barbeito S, Gutierrez M, Vega P, Ibáñez B, Haidar MK, Vieta E, Arango C. Cannabis and first-episode psychosis: different long-term outcomes depending on continued or discontinued use. Schizophr Bull. 2011;37(3):631-9.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3080669/pdf/sbp126.pdf

Marino L, Scodes J, Richkin T, Alves-Bradford JM, Nossel I, Wall M, Dixon L. Persistent cannabis use among young adults with early psychosis receiving coordinated specialty care in the United States. Schizophr Res. 2020 Aug;222:274-282.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8237378/pdf/nihms-1716175.pdf

Schoeler T, Monk A, Sami MB, Klamerus E, Foglia E, Brown R, Camuri G, Altamura AC, Murray R, Bhattacharyya S. Continued versus discontinued cannabis use in patients with psychosis: a systematic review and meta-analysis. Lancet Psychiatry. 2016;3(3):215-25.
https://www.thelancet.com/journals/lanpsy/article/PIIS2215-0366(15)00363-6/fulltext

" **the chances become 50:50 for eventually developing permanent psychosis**"
Arendt M, Mortensen PB, Rosenberg R, Pedersen CB, Waltoft BL. Familial predisposition for psychiatric disorder: comparison of subjects treated for cannabis-induced psychosis and schizophrenia. Arch Gen Psychiatry. 2008;65(11):1269-74. http://archpsyc.ama-assn.org/cgi/reprint/65/11/1269

Niemi-Pynttäri JA, Sund R, Putkonen H, Vorma 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. https://www.psychiatrist.com/jcp/article/Pages/2013/v74n01/v74n0115.aspx

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. https://ajp.psychiatryonline.org/doi/abs/10.1176/appi.ajp.2017.17020223?rfr_dat=cr_pub%3Dpubmed&url_ver=Z39.88-2003&rfr_id=ori%3Arid%3Acrossref.org&journalCode=ajp

"expensive for families and society" The current estimate of the direct [healthcare, housing, sustenance, social programs] and indirect (lost employment potential) cost of the chronic psychotic disorder schizophrenia is $343 billion dollars per year in the U.S. (Kadakia et al., 2022). On a population

basis, this means that even if Maryland realizes the tax revenues recently generated in Colorado from cannabis sales (in 2021 - $423 million), those revenues would be effectively wiped out if the prevalence of schizophrenia were to rise by only 10%.

Colorado Department of Revenue, Marijuana Tax Reports
https://cdor.colorado.gov/data-and-reports/marijuana-data/marijuana-tax-reports

Kadakia A, Catillon M, Fan Q, Williams GR, Marden JR, Anderson A, Kirson N, Dembek C. The Economic Burden of Schizophrenia in the United States. J Clin Psychiatry. 2022 Oct 10;83(6):22m14458.
https://www.psychiatrist.com/jcp/schizophrenia/economic-burden-schizophrenia-united-states/

"Those with cannabis-induced psychosis are ….. a danger to themselves"

Mortensen PB, Juel K. Mortality and causes of death in first admitted schizophrenic patients. Br J Psychiatry. 1993 Aug;163:183-9.
https://pubmed.ncbi.nlm.nih.gov/8075909/

Miller CL, Jackson MC, Sabet K. Marijuana and Suicide: Case-control Studies, Population Data, and Potential Neurochemical Mechanisms, in: Cannabis in Medicine. An Evidence Based Approach (K Finn, ed.) Springer Press, 2020

"but can also be a danger to others"

Harris AW, Large MM, Redoblado-Hodge A, Nielssen O, Anderson J, Brennan J. Clinical and cognitive associations with aggression in the first episode of psychosis. Aust N Z J Psychiatry. 2010 Jan;44(1):85-93.
https://www.ncbi.nlm.nih.gov/pubmed/20073570

Marino L, Scodes J, Richkin T, Alves-Bradford JM, Nossel I, Wall M, Dixon L. Persistent cannabis use among young adults with early psychosis receiving coordinated specialty care in the United States. Schizophr Res. 2020 Aug;222:274-282.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8237378/pdf/nihms-1716175.pdf

Moulin V, Baumann P, Gholamrezaee M, Alameda L, Palix J, Gasser J, Conus P. 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 .Front Psychiatry. 2018; 4;9:294
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6039574/pdf/fpsyt-09-00294.pdf

Moulin V, Alameda L, Framorando D, Baumann PS, Gholam M, Gasser J, Do Cuenod KQ, Conus P. Early onset of cannabis use and violent behavior in psychosis. Eur Psychiatry. 2020 Jul 16;63(1):e78.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7503178/pdf/S0924933820000711a.pdf

"15%? It's estimated to be the average for cannabis buds sold on the street"

ElSohly MA, Chandra S, Radwan M, Majumdar CG, Church JC. A Comprehensive Review of Cannabis Potency in the United States in the Last Decade. Biol Psychiatry Cogn Neurosci Neuroimaging. 2021 Jun;6(6):603-606.
https://pubmed.ncbi.nlm.nih.gov/33508497/

"**15% is not always safe**" (but the risk level is known for long-term use – Di Forti et al., 2015 – and it is undoubtedly less dangerous for mental health than more concentrated products - Petrilli et al., 2022 –and less likely to lead to addiction than concentrates – Cinnamon Bidwell et al., 2018; Petrilli et al., 2022)

Cinnamon Bidwell L, YorkWilliams SL, Mueller RL, Bryan AD, Hutchison KE. Exploring cannabis concentrates on the legal market: User profiles, product strength, and health-related outcomes. Addict Behav Rep. 2018 Aug 17;8:102-106.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6111049/pdf/main.pdf

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):233-8 https://www.thelancet.com/journals/lanpsy/article/PIIS2215-0366(14)00117-5/fulltext

Petrilli K, Ofori S, Hines L, Taylor G, Adams S, Freeman TP. Association of cannabis potency with mental ill health and addiction: a systematic review. Lancet Psychiatry. 2022 Sep;9(9):736-750.
https://pubmed.ncbi.nlm.nih.gov/35901795/

"From other states we know it's better to have these restrictions in place from the outset"

Rotering T, Apollonio DE. Cannabis industry lobbying in the Colorado state legislature in fiscal years 2010-2021. Int J Drug Policy. 2022 Apr;102:103585.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9632648/pdf/nihms-1846491.pdf

Pat Poblette, coloradopolitics.com, Feb. 23, 2023: Task force calls for previously scrapped THC potency cap, lawmakers skeptical.
https://www.coloradopolitics.com/news/task-force-calls-for-previously-scrapped-thc-potency-cap-lawmakers-skeptical/article_d6775ce2-10ec-11ec-bb37-6352d7a85b2c.html

"**HHS, which oversees HIPAA laws, states communication between healthcare providers and other entities is allowed if it is in the best interest of the patient."**

U.S. Department of Health and Human Services, Office of Civil Rights: HIPAA Privacy Rule and Sharing Information Related to Mental Health https://www.hhs.gov/sites/default/files/hipaa-privacy-rule-and-sharing-info-related-to-mental-health.pdf

"A health care provider may disclose a patient's PHI for treatment purposes without having to obtain the authorization of the individual. Treatment includes the coordination or management of health care by a

health care provider with a third party**. Health care means** care, services, or **supplies related to the health of an individual.** "

"When a patient poses a serious and imminent threat to his own or someone else's health or safety, HIPAA permits a health care professional to share the necessary information about the patient with **anyone** who is in a position to prevent or lessen the threatened harm."

"A hospital may disclose the necessary protected health information to **anyone** who is in a position to prevent or lessen the threatened harm"

"There are precedents for sharing healthcare information in the PDMP program" (and in oversight of gun sales)

The Prescription Drug Monitoring Program (PDMP) currently employed in Maryland, tracks a patient's opioid drug purchases via the CRISP database, and can block the filling of prescriptions at the point of sale when a patient has exceeded their limit.

The blocking of gun sales to someone with a diagnosed mental health condition is allowed by HIPAA and routinely applied in Maryland. In this case, the gun store owner does not necessarily know the reasons the gun sale is blocked, just that it is blocked.

"and a mechanism that would be easy to apply"

Cannabis dispensaries in other states routinely screen driver's licenses to verify age. Hb0837 that passed in 2022, stipulated data concerning outcomes from cannabis use should be tracked by the Cannabis Public Health Advisory Council: "DATA COLLECTION AND REPORTING OF DATA THAT MEASURES THE IMPACT OF CANNABIS CONSUMPTION AND LEGALIZATION". As part of this mission statement, a registry of cannabis-induced psychosis cases could be created, maintained with privacy protection by the Maryland Department of Health and coded with the driver's license number. Historical cases could be grandfathered-in, which would be important for establishing a baseline incidence necessary for subsequent data interpretation. **To facilitate the creation of this registry, it may be necessary to include cannabis-induced psychosis as one of the illnesses that are reportable to the state. The ICD10 codes would be ICD10 F12.15, ICD10 F12.25, and ICD10 F12.95**
https://www.icd10data.com/ICD10CM/Codes/F01-F99/F10-F19/F12-
Similar to other disorders that are reported, it is caused by an agent in the environment and the impact of that agent can be minimized if appropriate health measures are taken.
At the point of sale, the dispensary clerk would not know why the sale was rejected, but would direct the customer to contact the Alcohol, Tobacco and Cannabis Commission.

"You may hear that alcohol abuse causes chronic psychoses too, but it does so at 1/9th the rate"

Research in a Scandinavian country with approximately the same alcohol-use rates as the U.S., has shown that although temporary psychotic symptoms from alcohol occur more frequently because alcohol is used by a much larger proportion of the population, the conversion to chronic psychosis occurs 5% of the time from alcohol abuse but 46% of the time from cannabis abuse.
Niemi-Pynttäri JA, Sund R, Putkonen H, Vorma 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. https://www.psychiatrist.com/jcp/article/Pages/2013/v74n01/v74n0115.aspx

(alcohol psychosis, when it occurs) "**is milder"** (González-Pinto et al., 2011; Barrowclouch et al., 2014; Ouellet-Plamondon et al., 2017; Oluwoye et al., 2019; Cookey et al., 2020; and not as likely to cause the "positive" psychotic symptoms that are strongly associated with violence: paranoia, delusions and auditory hallucinations. Coid et al. (2016) found that the strongest significant predictor of violence towards strangers perpetrated by individuals with psychosis was paranoid ideation [Table 2 of Coid et al., 2016]. In point of fact, despite alcohol being more prevalently used on a regular basis than drugs that are illicit at the federal level, [50.9% used alcohol monthly versus 12.9% used any federally illicit substance monthly by 2019; National Survey on Drug Use and Health, 2018-2019], "substance use problem (other than alcohol)" is much more commonly associated with the suspects of homicide who were killed by law enforcement, according to the CDC, than is an alcohol use problem [12.6% versus 3.9%, respectively; Sheats et al., 2022, Table 5]).

Barrowclough C, Eisner E, Bucci S, Emsley R, Wykes T. The impact of alcohol on clinical outcomes in established psychosis: a longitudinal study. Addiction. 2014 Aug;109(8):1297-305."**Alcohol consumption was not associated with subsequent severity of psychotic symptoms**."
https://pubmed.ncbi.nlm.nih.gov/24773575/

Coid JW, Ullrich S, Bebbington P, Fazel S, Keers R. Paranoid Ideation and Violence: Meta-analysis of Individual Subject Data of 7 Population Surveys. Schizophr Bull. 2016 Jul;42(4):907-15.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4903063/pdf/sbw006.pdf

Cookey J, McGavin J, Crocker CE, Matheson K, Stewart SH, Tibbo PG. A Retrospective Study of the Clinical Characteristics Associated with Alcohol and Cannabis use in Early Phase Psychosis. Can J Psychiatry. 2020 Jun;65(6):426-435." **There were also group differences in positive psychotic symptoms (lowest in alcohol use group)."**
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7265604/pdf/10.1177_0706743720905201.pdf

González-Pinto A, Alberich S, Barbeito S, Gutierrez M, Vega P, Ibáñez B, Haidar MK, Vieta E, Arango C. Cannabis and first-episode psychosis: different long-term outcomes depending on continued or discontinued use. Schizophr Bull. 2011;37(3):631-9. "**quitting alcohol abuse or ceasing use of other drugs did not have a significant effect on the PANSS positive and PANSS negative scores**"
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3080669/pdf/sbp126.pdf

National Survey on Drug Use and Health: Comparison of 2017-2018 and 2018-2019 Population Percentages (50 States and the District of Columbia)
https://www.samhsa.gov/data/sites/default/files/reports/rpt32806/2019NSDUHsaeShortTermCHG/2019NSDUHsaeShortTermCHG/2019NSDUHsaeShortTermCHG.pdf

Oluwoye O, Monroe-DeVita M, Burduli E, Chwastiak L, McPherson S, McClellan JM, McDonell MG. Impact of tobacco, alcohol and cannabis use on treatment outcomes among patients experiencing first episode psychosis: Data from the national RAISE-ETP study. Early Interv Psychiatry. 2019 Feb;13(1):142-146. "Cannabis users (β = 1.56; 95% CI = 0.31–2.81, P < .05) had significantly higher scores on the PANSS positive symptoms subscale during treatment relative to non-cannabis users. **Alcohol use was not a significant predictor for PANSS subscales** (see Tables 2 and 3)."
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6684200/pdf/nihms-1044285.pdf

Ouellet-Plamondon C, Abdel-Baki A, Salvat É, Potvin S. Specific impact of stimulant, alcohol and cannabis use disorders on first-episode psychosis: 2-year functional and symptomatic outcomes. Psychol Med. 2017 Oct;47(14):2461-2471. "**The only group that deteriorated from years 1 to 2 (symptoms and functioning) were patients with persistent CUD** (cannabis use disorder) **alone**."
https://pubmed.ncbi.nlm.nih.gov/28424105/

Sheats KJ, Wilson RF, Lyons BH, Jack SP, Betz CJ, Fowler KA. Surveillance for Violent Deaths—National Violent Death Reporting System, 39 States, the District of Columbia, and Puerto Rico, 2018. MMWR Surveillance Summaries. 2022 Jan 1;71(3):1.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8807052/pdf/ss7103a1.pdf

"with a peak onset much later in life"

In Scandinavian countries, regarded as having the most complete healthcare registries in the world, the peak onset age for **cannabis induced psychosis ranges from 24 to 26 years** of age and for **alcohol-induced psychosis, from 47 to 53 years** of age (see Table 1 in the reference below):

Rognli EB, Taipale H, Hjorthøj C, Mittendorfer-Rutz E, Bramness JG, Heiberg IH, Niemelä S. Annual incidence of substance-induced psychoses in Scandinavia from 2000 to 2016. Psychol Med. 2022 Aug 19:1-10.
https://pubmed.ncbi.nlm.nih.gov/35983644/