

The Standing Committee of European Doctors (CPME) represents national medical associations across Europe. We are committed to contributing the medical profession's point of view to EU and European policy-making through pro-active cooperation on a wide range of health and healthcare related issues.

Policy on Adverse Health Effects of Cannabis

European doctors:

1. Warn that cannabis is a hazardous and addictive drug and a serious public health concern, and therefore discourages cannabis use.
2. Encourage local, national, and European public health agencies to improve surveillance efforts to ensure that more data is available on the short- and long-term health effects of cannabis, especially emergency department visits and hospitalisations, impaired driving, workplace impairment and worker-related injury and safety, and prevalence of psychiatric and addictive disorders, including cannabis use disorder.
3. Advocate for products containing cannabis to be subject to the same regulatory and licensing process as other prescription products.
4. Advocate for stronger public health messaging across the entire population regarding the adverse health effects of cannabis and cannabinoid inhalation and ingestion, with an emphasis on reducing initiation and frequency of cannabis use among adolescents, especially high potency products; use among women who are pregnant or contemplating pregnancy; and avoiding cannabis-impaired driving.
5. Advocate for accessible, comprehensive and evidence-based treatment to be provided to people suffering from cannabis use disorder or any other cannabis induced health problem.
6. Strongly oppose further legalisation across Europe as the weight of current evidence indicates that legalisation adds to health harms across the population.

7. Advocate evaluation of countries that have legalised cannabis to assess the impact on public health.
8. Call for:
 - an age limit of 21 years or older for the purchase of cannabis,
 - regulating retail sales,
 - banning of all marketing and promotional activities intended to encourage use or to recruit customers,
 - limiting the potency of cannabis extracts and concentrates,
 - requiring packaging to convey meaningful and easily understood units of consumption, and warnings regarding known risks of use, and
 - requiring that for commercially available edibles, packaging must be child-resistant, come with messaging about the hazards about unintentional ingestion in children and youth and should not in any way resemble sweets or confectionaries consumed by children.
9. Encourage research and dissemination of information on the impact of legalisation and decriminalisation of cannabis in an effort to promote public health and public safety.
10. Support public health-based strategies rather than incarceration with respect to individuals possessing small quantities of cannabis for personal use.

1. Adverse health effects of cannabis

Climate Cannabis is the most consumed illicit drug in Europe. Latest estimates from the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA)¹ indicate that about 23 million adults (8% of 15–64-year-olds) used cannabis in 2022². It is also estimated that around 1.3% of adults in the European Union (3.7 million people) use cannabis daily or almost daily. Moreover, it is estimated that 0.6% of adults in Europe have a cannabis use disorder (CUD), which represents about 1.7 million people³. Using this estimate, the Global Burden of Disease Study estimates that CUD in Europe is associated with 158,000,000 disability adjusted life years (DALYs).

In epidemiological research, it is difficult to prove causality in relationships between potential risk behaviours and adverse outcomes. The precautionary principle dictates that doctors must however also pay attention to evidence which falls short of this high standard. In discussing potential risks below, priority is given to prospective studies and meta-analyses. However, even high-quality prospective studies may underestimate risks as many recruited study participants 30–40 years ago when cannabis potency was much lower than today⁴.

This paper does not seek to review the evidence regarding potential therapeutic benefits of cannabis-based products and cannabinoids in specific medical conditions^{5 6}.

1.1 Acute health risks

Cannabis tops the list of drugs involved in drug related attendances at hospital emergency departments (ED) in Europe⁷. In cases where cannabis is the only drug involved, the most common presenting complaints are anxiety, vomiting, agitation, palpitations, reduced consciousness, acute psychosis, hallucinations, chest pain, headache, hypotension,

¹ EMCDDA will turn into the European Union Drugs Agency (EUDA) on 1 July 2024.

² EMCDDA 2023. Cannabis Laws in Europe. *Luxembourg: Publications Office of the European Union*.

³ Manthey, J., Freeman, T. P., Kilian, C., López-Pelayo, H. & Rehm, J. 2021. Public health monitoring of cannabis use in Europe: prevalence of use, cannabis potency, and treatment rates. *The Lancet Regional Health–Europe*, 10, 100227.

⁴ McDonald, A. J., Roerecke, M., & Mann, R. E. (2019). Adolescent cannabis use and risk of mental health problems—the need for newer data. *Addiction*, 114(10), 1889–1890

⁵ HPRA (2017). Cannabis for medical use. A scientific review. Health Products Regulatory Agency, Dublin

⁶ Solmi, M., De Toffol, M., Kim, J. Y., Choi, M. J., Stubbs, B., Thompson, T., ... & Dragioti, E. (2023). Balancing risks and benefits of cannabis use: umbrella review of meta-analyses of randomised controlled trials and observational studies. *bmj*, 382.

⁷ Miró, Ò., Burillo-Putze, G., Schmid, Y., Salgado, E., Liechti, M. E., Dines, A. M., Giraudon, I., Heyerdahl, F., Hovda, K. E., Vallersne, O. M., Eyer, F., Wood, D. M., Yates, C., Dargan, P. I. & Galicia, M. 2023. Severity of emergency department presentations due to acute drug toxicity in Europe: a longitudinal analysis over a 6-year period (2014–2019) stratified by sex. *Eur J Emerg Med*, 30, 21–31.

hypertension, and seizures⁸. Cannabis related ED attendances required hospital admission in 14% of cases and ICU admission in 2%. By way of contrast, the corresponding proportions for cocaine related ED attendances were 20% and 3%⁹.

Tetrahydrocannabinol (THC) is the major psychoactive constituent in cannabis and the key cannabinoid responsible for both intoxication and adverse mental health effects of cannabis¹⁰. Modern cannabis tends to have higher concentrations of THC and higher potency is associated with greater likelihood of mental health problems¹¹.

The prominence of vomiting as an issue in EDs may relate in part to cannabinoid hyperemesis syndrome (CHS)¹². This is a condition involving persistent severe vomiting which can affect a minority of regular users of cannabis.

Moreover, the consumption of cannabis may affect the attention, concentration, memory and psychomotoric functions, which can lead to impaired driving ability and increases the risk of accidents, resulting in a risk of self-harm for the user^{13 14}.

Cannabis products are becoming increasingly diverse, including extracts and edibles. The arrival of synthetic cannabinoid receptor agonists (SCRA) has complicated the acute medical and psychiatric presentations. They produce similar but more severe effects to cannabis which may even be lethal in some cases^{15 16 17}.

⁸ Schmid, Y., Galicia, M., Vogt, S. B., Liechti, M. E., Burillo-Putze, G., Dargan, P. I., Dines, A. M., Giraudon, I., Heyerdahl, F., Hovda, K. E., Wood, D. M., Yates, C. & Miró, Ó. 2022. Differences in clinical features associated with cannabis intoxication in presentations to European emergency departments according to patient age and sex. *Clin Toxicol (Phila)*, 60, 912-919.

⁹ Miró, Ó., Burillo-Putze, G., Schmid, Y., Salgado, E., Liechti, M. E., Dines, A. M., Giraudon, I., Heyerdahl, F., Hovda, K. E., Vallsne, O. M., Eyer, F., Wood, D. M., Yates, C., Dargan, P. I. & Galicia, M. 2023. Severity of emergency department presentations due to acute drug toxicity in Europe: a longitudinal analysis over a 6-year period (2014-2019) stratified by sex. *Eur J Emerg Med*, 30, 21-31.

¹⁰ Murray, R. M., Quigley, H., Quattrone, D., Englund, A. & Di Forti, M. 2016. Traditional marijuana, high-potency cannabis and synthetic cannabinoids: increasing risk for psychosis. *World Psychiatry*, 15, 195-204.

¹¹ 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. doi: 10.1016/S2215-0366(22)00161-4. Epub 2022 Jul 25. PMID: 35901795.

¹² Chocron, Y., Zuber, J.-P. & Vaucher, J. 2019. Cannabinoid hyperemesis syndrome. *Bmj*, 366.

¹³ Hall, W. 2015. What has research over the past two decades revealed about the adverse health effects of recreational cannabis use? *Addiction*, 110, 19-35.

¹⁴ Solmi, M., De Toffol, M., Kim, J. Y., Choi, M. J., Stubbs, B., Thompson, T., ... & Dragioti, E. (2023). Balancing risks and benefits of cannabis use: umbrella review of meta-analyses of randomised controlled trials and observational studies. *bmj*, 382.

¹⁵ Winstock, A., Lynskey, M., Borschmann, R. & Waldron, J. 2015. Risk of emergency medical treatment following consumption of cannabis or synthetic cannabinoids in a large global sample. *J Psychopharmacol*, 29, 698-703.

¹⁶ Potts, A., Cano, C., Thomas, S. & Hill, S. 2020. Synthetic cannabinoid receptor agonists: classification and nomenclature. *Clinical Toxicology*, 58, 82-98.

¹⁷ Tait R.J., Caldicott, D., Mountain, D., Hill, S.L. & Lenton, S., 2016. A systematic review of adverse events arising from the use of synthetic cannabinoids and their associated treatment. *Clinical toxicology*, 54(1), pp.1-13.

1.2 Chronic harms

Cannabis is an addictive substance^{18 19}. It is estimated that about one in five people who use cannabis have a CUD²⁰. This risk increases with early onset of use and more frequent use. It is estimated that one in three young people who used cannabis at least weekly had cannabis dependence, this being the more severe form of CUD.

Regular cannabis use is associated with a range of chronic harms. Many of these relate to mental health, such as psychosis, mania, depression and anxiety disorders^{21 22 23 24 25 26 27}. Especially, cannabis use during adolescence carries a great concern from a mental health perspective²⁸. The exposure to THC can cause disturbances of maturation of the human brain^{29 30 31}. Cannabis use in youth is also associated with a higher risk of subsequent suicide attempts and suicidal thoughts in young adulthood^{32 33 34}.

There is also evidence which suggests that cannabis use during adolescence is associated with a small decline in IQ evident in later adulthood^{35 36 37}. The endo-cannabinoid system is involved

¹⁸ Volkow, N. D., Baler, R. D., Compton, W. M. & Weiss, S. R. 2014. Adverse health effects of marijuana use. *New England Journal of Medicine*, 370, 2219–2227.

¹⁹ Connor, J. P., Stjepanović, D., Le Foll, B., Hoch, E., Budney, A. J. & Hall, W. D. 2021. Cannabis use and cannabis use disorder. *Nature Reviews Disease Primers*, 7, 16.

²⁰ Leung, J., Chan, G. C., Hides, L. & Hall, W. D. 2020. What is the prevalence and risk of cannabis use disorders among people who use cannabis? A systematic review and meta-analysis. *Addictive Behaviors*, 109, 106479.

²¹ Murray, R. M., Quigley, H., Quattrone, D., Englund, A. & Di Forti, M. 2016. Traditional marijuana, high-potency cannabis and synthetic cannabinoids: increasing risk for psychosis. *World Psychiatry*, 15, 195–204.

²² Gobbi, G., Atkin, T., Zytynski, T., Wang, S., Askari, S., Boruff, J., Ware, M., Marmorstein, N., Cipriani, A., Dendukuri, N. & Mayo, N. 2019. Association of Cannabis Use in Adolescence and Risk of Depression, Anxiety, and Suicidality in Young Adulthood: A Systematic Review and Meta-analysis.

²³ Solmi, M., De Toffol, M., Kim, J. Y., Choi, M. J., Stubbs, B., Thompson, T., ... & Dragioti, E. (2023). Balancing risks and benefits of cannabis use: umbrella review of meta-analyses of randomised controlled trials and observational studies. *bmj*, 382.

²⁴ Myran, D. T., Harrison, L. D., Pugliese, M., Solmi, M., Anderson, K. K., Fiedorowicz, J. G., ... & Tanuseputro, P. (2023b). Transition to Schizophrenia Spectrum Disorder Following Emergency Department Visits Due to Substance Use With and Without Psychosis. *JAMA psychiatry*. doi:10.1001/jamapsychiatry.2023.3582

²⁵ Gibbs, M., Winsper, C., Marwaha, S., Gilbert, E., Broome, M., Singh, S. P. Cannabis use and mania symptoms: a systematic review and meta-analysis. *Journal of affective disorders*, 2015; <https://pubmed.ncbi.nlm.nih.gov/25285897/>.

²⁶ Hoch, E., Friemel, C.M., Schneider, M. (2019), [Study on Cannabis Potential and Risks](#) (CaPRis); Federal Ministry of Health Germany.

²⁷ Kedzior, K. K., Læber, L. T., A positive association between anxiety disorders and cannabis use or cannabis use disorders in the general population—a meta-analysis of 31 studies.

²⁸ Hall, W., Leung, J. & Lynskey, M. 2020. The Effects of Cannabis Use on the Development of Adolescents and Young Adults. *Annual Review of Developmental Psychology*, 2, 461–483.

²⁹ Costentin, J. [Les effets épigénétiques du cannabis/tétrahydrocannabinol](#). *Bulletin de l'Académie Nationale de Médecine*, 2020, 570–576.

³⁰ Smith, A., Kaufman, F., Sandy, M.S. et al. [Cannabis Exposure During Critical Windows of Development: Epigenetic and Molecular Pathways Implicated in Neuropsychiatric Disease](#). *Curr Envir Health Rpt* 7, 325–342 (2020).

³¹ Tomas-Roig, J., Benito, E., Agis-Balboa, R., Piscitelli, F., Hoyer-Fender, S., Di Marzo, V., Havemann-Reinecke, U., [Chronic exposure to cannabinoids during adolescence causes long-lasting behavioral deficits in adult mice](#). *Addiction Biology*. 2017, 1778–1789.

³² Gobbi, G., Atkin, T., Zytynski, T., Wang, S., Askari, S., Boruff, J., Ware, M., Marmorstein, N., Cipriani, A., Dendukuri, N. & Mayo, N. 2019. Association of Cannabis Use in Adolescence and Risk of Depression, Anxiety, and Suicidality in Young Adulthood: A Systematic Review and Meta-analysis.

³³ Han, B., Compton, W. M., Einstein, E. B. & Volkow, N. D. 2021. Associations of Suicidality Trends With Cannabis Use as a Function of Sex and Depression Status. *JAMA Network Open*, 4, e2113025–e2113025.

³⁴ Zahra, E., Darke, S., Degenhardt, L. & Campbell, G. 2020. Rates, characteristics and manner of cannabis-related deaths in Australia 2000–2018. *Drug Alcohol Depend*, 212, 108028.

³⁵ Meier, M. H., Caspi, A., Ambler, A., Harrington, H., Houts, R., Keefe, R. S., McDonald, K., Ward, A., Poulton, R. & Moffitt, T. E. 2012. Persistent cannabis users show neuropsychological decline from childhood to midlife. *Proceedings of the National Academy of Sciences*, 201206820.

³⁶ Meier, M. H., Caspi, A., A. R. K., Hall, W., Ambler, A., Harrington, H., Hogan, S., R. M. H., Poulton, R., Ramrakha, S., Hariri, A. R. & Moffitt, T. E. 2022. Long-Term Cannabis Use and Cognitive Reserves and Hippocampal Volume in Midlife. *Am J Psychiatry*, 179, 362–374.

³⁷ Power, E., Sabherwal, S., Healy, C., A. O. N., Cotter, D. & Cannon, M. 2021. Intelligence quotient decline following frequent or dependent cannabis use in youth: a systematic review and meta-analysis of longitudinal studies. *Psychol Med*, 51, 194–200.

in guiding key aspects of the delicate process of brain maturation which occurs across adolescence and into young adulthood³⁸. There are also apparent impacts of adolescent cannabis use on changes in white matter in longitudinal brain imaging studies^{39 40 41}. Also grey matter volume differences associated with extremely low levels of cannabis use in adolescence have been reported⁴².

There may also be negative psychosocial consequences especially for persons who start consuming cannabis at an early age (less than 15 years), such as frequent school dropouts and lower degrees^{43 44 45 46}.

Cannabis use is also causally related to subsequent development of illnesses such as schizophrenia⁴⁷. It is estimated that 12% of cases of first episode psychosis are attributable to high potency cannabis, but any potency cannabis increases the risk of development of a psychosis. This proportion rose to a high of 30% in London and 50% in Amsterdam⁴⁸. It is also estimated that 30% of schizophrenia cases in young males could be related to a pre-existing cannabis use disorder⁴⁹.

In Europe, 80,000 people entered addiction treatment with cannabis as their main problem substance in 2020⁵⁰. About 5% of people with a CUD access specialist addiction treatment in any one year as the estimated prevalence of CUD is 0.6% among people aged 15 to 64 years.

³⁸ Lubman, D. I., Cheetham, A. & Yücel, M. 2015. Cannabis and adolescent brain development. *Pharmacology & therapeutics*, 148, 1-16.

³⁹ Owens, M. M., Albaugh, M. D., Allgaier, N., Yuan, D., Robert, G., Cupertino, R. B., Spechler, P. A., Juliano, A., Hahn, S., Banaschewski, T., Bokde, A. L. W., Desrivieres, S., Flor, H., Grigis, A., Gowland, P., Heinz, A., Brühl, R., Martinot, J. L., Martinot, M. P., Artiges, E., Nees, F., Orfanos, D. P., Lemaitre, H., Paus, T., Poustka, L., Millenet, S., Fröhner, J. H., Smolka, M. N., Walter, H., Whelan, R., Mackey, S., Schumann, G. & Garavan, H. 2022. Bayesian causal network modeling suggests adolescent cannabis use accelerates prefrontal cortical thinning. *Transl Psychiatry*, 12, 188.

⁴⁰ Albaugh, M. D., Ottino-Gonzalez, J., Sidwell, A., Lepage, C., Juliano, A., Owens, M. M., Chaarani, B., Spechler, P., Fontaine, N., Rioux, P., Lewis, L., Jeon, S., Evans, A., D'souza, D., Radhakrishnan, R., Banaschewski, T., Bokde, A. L. W., Quinlan, E. B., Conrod, P., Desrivieres, S., Flor, H., Grigis, A., Gowland, P., Heinz, A., Ittermann, B., Martinot, J.-L., Paillère Martinot, M.-L., Nees, F., Papadopoulos Orfanos, D., Paus, T., Poustka, L., Millenet, S., Fröhner, J. H., Smolka, M. N., Walter, H., Whelan, R., Schumann, G., Potter, A., Garavan, H. & Consortium, I. 2021. Association of Cannabis Use During Adolescence With Neurodevelopment. *JAMA Psychiatry*, 78, 1031-1040.

⁴¹ Albaugh, M. D., Owens, M. M., Juliano, A., Ottino-Gonzalez, J., Cupertino, R., Cao, Z., ... & IMAGEN Consortium. (2023). Differential associations of adolescent versus young adult cannabis initiation with longitudinal brain change and behavior. *Molecular psychiatry*, 1-10.

⁴² Orr, C., Spechler, P., Cao, Z., Albaugh, M., Chaarani, B., Mackey, S., D'souza, D., Allgaier, N., Banaschewski, T., Bokde, A. L. W., Bromberg, U., Buchel, C., Burke Quinlan, E., Conrod, P., Desrivieres, S., Flor, H., Frouin, V., Gowland, P., Heinz, A., Ittermann, B., Martinot, J. L., Martinot, M. P., Nees, F., Papadopoulos Orfanos, D., Paus, T., Poustka, L., Millenet, S., Fröhner, J. H., Radhakrishnan, R., Smolka, M. N., Walter, H., Whelan, R., Schumann, G., Potter, A. & Garavan, H. 2019. Grey Matter Volume Differences Associated with Extremely Low Levels of Cannabis Use in Adolescence. *J Neurosci*, 39, 1817-1827.

⁴³ Boden, J. M., Dhakel, B., Foulds, J. A., & Horwood, L. J. (2020). Life-course trajectories of cannabis use: a latent class analysis of a New Zealand birth cohort. *Addiction*, 115(2), 279-290.

⁴⁴ Fergusson, D. M., Boden, J. M., & Horwood, L. J. (2015). Psychosocial sequelae of cannabis use and implications for policy: findings from the Christchurch Health and Development Study. *Social psychiatry and psychiatric epidemiology*, 50, 1317-1326.

⁴⁵ Danielsson, A. K., Falkstedt, D., Hemmingsson, T., Allebeck, P., & Agardh, E. (2015). Cannabis use among Swedish men in adolescence and the risk of adverse life course outcomes: results from a 20 year-follow-up study. *Addiction*, 110(11), 1794-1802.

⁴⁶ Volkow, N. D., Baler, R. D., Compton, W. M. & Weiss, S. R. 2014. Adverse health effects of marijuana use. *New England Journal of Medicine*, 370, 2219-2227.

⁴⁷ Power, E., Healy, C., Murray, R. M., & Cannon, M. (2023). Does Cannabis Cause Psychosis?, 167. In D'Souza, D. C., Castle, D., & Murray, R. (Eds.). *Marijuana and madness*. Cambridge University Press.

⁴⁸ Di Forti, M., Quattrone, D., Freeman, T. P., Tripoli, G., Gayer-Anderson, C., Quigley, H., Rodriguez, V., Jongsma, H. E., Ferraro, L. & La Cascia, C. 2019. The contribution of cannabis use to variation in the incidence of psychotic disorder across Europe (EU-GEI): a multicentre case-control study. *The Lancet Psychiatry*.

⁴⁹ Hjorthøj, C., Compton, W., Starzer, M., Nordholm, D., Einstein, E., Erlangsen, A., Nordentoft, M., Volkow, N. D. & Han, B. 2023. Association between cannabis use disorder and schizophrenia stronger in young males than in females. *Psychological medicine*, 1-7.

⁵⁰ EMCDDA 2022. European Drug Report 2020: Trends and Developments. *Luxembourg: Publications Office of the European Union*.

Among people who were entering their first ever addiction treatment episode in 2020, 43,000 presented with CUD⁵¹. Cannabis remained the drug which generated the most demand among first-time treatment entrants, accounting for 45% of all such episodes⁵². Among new entrants into addiction treatment in Europe the rate of attendance with CUD increased by 35% from 2010 to 2018.

Cannabis dependence can result in withdrawal symptoms⁵³. The most common symptoms are: (i) irritability, anger or aggression, (ii) nervousness or anxiety, (iii) sleep difficulty, (iv) decreased appetite or weight loss, (v) restlessness and (vi) depressed mood.

Cannabis smoke contains many of the same toxins and carcinogens as tobacco smoke^{54 55 56}. There is also evidence of a risk of chronic bronchitis⁵⁷. There is no proven link yet between cannabis use and lung cancer from epidemiological research, but there is evidence of an association between cannabis use and non-seminoma testicular cancer^{58 59 60}.

Finally, there are cardiac concerns⁶¹. Cannabis use may be linked to an increased risk of heart attacks, atrial fibrillation and heart failure^{62 63}. There are also concerns regarding increased risk of strokes⁶⁴.

⁵¹ Ibid.

⁵² Ibid.

⁵³ Connor, J. P., Stjepanović, D., Budney, A. J., Le Foll, B. & Hall, W. D. 2022. Clinical management of cannabis withdrawal. *Addiction*, 117, 2075–2095.

⁵⁴ American Lung Association 2022. *Marijuana and lung health*. [Online]. Available: <https://www.lung.org/quit-smoking/smoking-facts/health-effects/marijuana-and-lung-health> [Accessed 30/4/2023].

⁵⁵ California Environmental Protection Agency 2009. [Evidence of the carcinogenicity of marijuana smoke](#).

⁵⁶ Canadian Lung Association 2018. *Message from the president and CEO: Smoking Cannabis and Lung Health* [Online]. Available: <https://www.lung.ca/message-president-and-ceo-smoking-cannabis-and-lung-health> [Accessed 28/9/2023].

⁵⁷ American Lung Association 2022. *Marijuana and lung health*. [Online]. Available: <https://www.lung.org/quit-smoking/smoking-facts/health-effects/marijuana-and-lung-health> [Accessed 30/4/2023].

⁵⁸ Hoch, E, Friemel, C.M., Schneider, M. (2019), [Study on Cannabis Potential and Risks \(CaPRis\)](#): Federal Ministry of Health Germany.

⁵⁹ Callaghan, R. C., Allebeck, P., Akre, O., McGlynn, K. A., & Sidorchuk, A. (2017). Cannabis use and incidence of testicular cancer: a 42-year follow-up of Swedish men between 1970 and 2011. *Cancer Epidemiology, Biomarkers & Prevention*, 26(11), 1644–1652.

⁶⁰ Gurney, J., Shaw, C., Stanley, J., Signal, V., & Sarfati, D. (2015). Cannabis exposure and risk of testicular cancer: a systematic review and meta-analysis. *BMC cancer*, 15, 1–10.

⁶¹ Patel, R. S., Manocha, P., Patel, J., Patel, R. & Tankersley, W. E. 2020. Cannabis Use Is an Independent Predictor for Acute Myocardial Infarction Related Hospitalization in Younger Population. *J Adolesc Health*, 66, 79–85.

⁶² Page, R. L., 2nd, Allen, L. A., Kloner, R. A., Carriker, C. R., Martel, C., Morris, A. A., Piano, M. R., Rana, J. S. & Saucedo, J. F. 2020. Medical Marijuana, Recreational Cannabis, and Cardiovascular Health: A Scientific Statement From the American Heart Association. *Circulation*, 142, e131–e152.

⁶³ Bahji, A., Hathaway, J., Adams, D., Crockford, D., Edelman, E. J., Stein, M. D., & Patten, S. B. (2023). [Cannabis use disorder and adverse cardiovascular outcomes: A population-based retrospective cohort analysis of adults from Alberta, Canada](#). *Addiction*.

⁶⁴ Testai, F. D., Gorelick, P. B., Aparicio, H. J., Filbey, F. M., Gonzalez, R., Gottesman, R. F., Melis, M., Piano, M. R., Rubino, T. & Song, S. Y. 2022. Use of Marijuana: Effect on Brain Health: A Scientific Statement From the American Heart Association. *Stroke*, 53, e176–e187.

1.3 Harm to others

Beyond the individual using cannabis, there are also potential adverse health impacts on those around them, an issue that is now referred to as harm-to-others^{65 66}.

Firstly, cannabis intoxication impairs driving ability and increases the risk of a road traffic collision by two- to three-fold^{67 68}. Cannabis impaired drivers are involved in more crashes, injuries and fatalities^{69 70 71 72}.

While the origins of violence are certainly complex and multifactorial, there is growing evidence that cannabis may contribute to violent behaviour^{73 74}. Regular cannabis use is associated for example with a two- to three-fold increased risk of intimate partner violence⁷⁵. In patients with psychosis, ongoing cannabis use is associated with increased risk of violence^{76 77}. Parents of adolescents attending addiction services report issues with aggression with surprising frequency in cases of CUD. The issues with anger may relate to cannabis withdrawals, irritability being a core symptom of same⁷⁸.

Where it is the parent who has the CUD, this may adversely impact parenting of their children. Parental drug use constitutes an adverse childhood experience (ACE), and increased ACEs in childhood are associated with a wide range of poor outcomes^{79 80}.

⁶⁵ Boury, H., Hall, W. & Fischer, B. 2022. Developments and Changes in Primary Public Health Outcome Indicators Associated with the Legalization of Non-Medical Cannabis Use and Supply in Canada (2018): A Comprehensive Overview. *International Journal of Mental Health and Addiction*, 1-15.

⁶⁶ Fischer, B., Lindner, S. R., Jutras-Aswad, D., & Hall, W. (2023). [Cannabis use and health-related 'harm-to-others': Towards a conceptual framework and evidence-base for public health](#). *Journal of studies on alcohol and drugs*, jsad-22.

⁶⁷ Hall, W. 2015. What has research over the past two decades revealed about the adverse health effects of recreational cannabis use? *Addiction*, 110, 19-35.

⁶⁸ Solmi, M., De Toffol, M., Kim, J. Y., Choi, M. J., Stubbs, B., Thompson, T., ... & Dragioti, E. (2023). Balancing risks and benefits of cannabis use: umbrella review of meta-analyses of randomised controlled trials and observational studies. *bmj*, 382.

⁶⁹ Lane, T. J. & Hall, W. 2019. Traffic fatalities within US states that have legalized recreational cannabis sales and their neighbours. *Addiction*, 114, 847-856.

⁷⁰ Rocky Mountain HIDTA 2019. Legalization Of Marijuana In Colorado: The Impact. Rocky Mountain High Intensity Drug Trafficking Area.

⁷¹ Brubacher, J. R., Chan, H., Erdelyi, S., Staples, J. A., Asbridge, M. & Mann, R. E. 2022. Cannabis legalization and detection of tetrahydrocannabinol in injured drivers. *New England journal of medicine*, 386, 148-156.

⁷² Myran, D. T., Gaudreault, A., Pugliese, M., Manuel, D. G., & Tanuseputro, P. (2023d). Cannabis-involved traffic injury emergency department visits after cannabis legalization and commercialization. *JAMA network open*, 6(9), e2331551-e2331551.

⁷³ Daldegan-Bueno, D., Lindner, S. R. & Fischer, B. 2022. Conceptualizing and considering Cannabis-Related "Harm-to-Others": The Role of Cannabis-Related Violence. *Substance Use & Misuse*, 57, 1488-1491.

⁷⁴ Dellazizzo, L., Potvin, S., Dou, B. Y., Beaudoin, M., Luigi, M., Giguère, C. É., & Dumais, A. (2020a). Association between the use of cannabis and physical violence in youths: a meta-analytical investigation. *American journal of psychiatry*, 177(7), 619-626.

⁷⁵ Dellazizzo, L., Potvin, S., Athanassiou, M. & Dumais, A. 2020b. Violence and cannabis use: a focused review of a forgotten aspect in the era of liberalizing cannabis. *Frontiers in psychiatry*, 11, 567887.

⁷⁶ Dugré, J. R., Dellazizzo, L., Giguère, C.-É., Potvin, S. & Dumais, A. 2017. Persistency of cannabis use predicts violence following acute psychiatric discharge. *Frontiers in psychiatry*, 8, 176.

⁷⁷ Beaudoin, M., Dellazizzo, L., Giguère, S., Guay, J.-P., Giguère, C.-É., Potvin, S. & Dumais, A. 2023. Is There a Dose-Response Relationship Between Cannabis Use and Violence? A Longitudinal Study in Individuals with Severe Mental Disorders. *Cannabis and cannabinoid research*.

⁷⁸ Connor, J. P., Stjepanović, D., Budney, A. J., Le Foll, B. & Hall, W. D. 2022. Clinical management of cannabis withdrawal. *Addiction*, 117, 2075-2095.

⁷⁹ Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V. & Marks, J. S. 1998. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACE) Study. *American journal of preventive medicine*, 14, 245-258.

⁸⁰ Hughes, K., Bellis, M. A., Hardcastle, K. A., Sethi, D., Butchart, A., Mikton, C., Jones, L. & Dunne, M. P. 2017. The effect of multiple adverse childhood experiences on health: a systematic review and meta-analysis. *Lancet Public Health*, 2, e356-e366.

Thirdly, there are likely to be issues with second-hand cannabis smoke, given the pulmonary risks noted earlier^{81 82}.

Finally, there are risks if cannabis is used during pregnancy^{83 84}. These include low birth weight and pre-term delivery^{85 86}. There is growing evidence of adverse neuro-psychological impacts in children exposed to cannabis in-utero^{87 88}.

2. Legislative options to reduce harms

During the past years, the general trend in national laws in Europe has been to reduce, or even remove, penalties for minor cannabis possession offences. Currently, five EU Member States (Czechia, Germany, Luxembourg, Malta and the Netherlands) and Switzerland are introducing, or planning to introduce, new approaches to regulate the supply of cannabis for recreational use⁸⁹.

Laws and sanctions are utilised across many areas of public health to nudge the behaviour of citizens away from risky behaviours and towards healthier actions. Legislative measures often play a role in achievement of positive outcomes in areas of public health including efforts to curtail mortality and injury related to road traffic collisions and most recently during the COVID-19 pandemic.

2.1 Cannabis legalisation – regulating sale of cannabis

Legalisation of cannabis has been touted as a policy option worth consideration⁹⁰. In theory, regulated sale could allow consumers to source a product of consistent quality and could hypothetically reduce the likelihood of adverse outcomes. Enthusiasm for legalisation tends to be highest among those who use cannabis and those who perceive low risk associated with

⁸¹ American Lung Association 2022. *Marijuana and lung health*. [Online]. Available: <https://www.lung.org/quit-smoking/smoking-facts/health-effects/marijuana-and-lung-health> [Accessed 30/4/2023].

⁸² Mckee, G., McClure, S., Fyfe, M. & Stanwick, R. 2018. Protecting the public from exposure to secondhand cannabis smoke and vapour following legalization. *Can J Public Health*, 109, 223–226.

⁸³ Bandoli, G., Delker, E., Schumacher, B. T., Baer, R. J., Kelly, A. E. & Chambers, C. D. 2023. Prenatal cannabis use disorder and infant hospitalization and death in the first year of life. *Drug and Alcohol Dependence*, 242, 109728.

⁸⁴ Solmi, M., De Toffol, M., Kim, J. Y., Choi, M. J., Stubbs, B., Thompson, T., ... & Dragioti, E. (2023). Balancing risks and benefits of cannabis use: umbrella review of meta-analyses of randomised controlled trials and observational studies. *bmj*, 382.

⁸⁵ Marchand, G., Masoud, A. T., Govindan, M., Ware, K., King, A., Ruther, S., Brazil, G., Ulibarri, H., Parise, J. & Arroyo, A. 2022. Birth outcomes of neonates exposed to marijuana in utero: A systematic review and meta-analysis. *JAMA Network Open*, 5, e2145653–e2145653.

⁸⁶ Dodge, P., Nadolski, K., Kopkau, H., Zablocki, V., Forrestal, K. & Bailey, B. A. 2023. The impact of timing of in utero marijuana exposure on fetal growth. *Frontiers in Pediatrics*, 11.

⁸⁷ Baranger, D. A., Paul, S. E., Colbert, S. M., Karcher, N. R., Johnson, E. C., Hatoum, A. S. & Bogdan, R. 2022. Association of mental health burden with prenatal cannabis exposure from childhood to early adolescence: longitudinal findings from the adolescent brain cognitive development (ABCD) study. *JAMA pediatrics*, 176, 1261–1265.

⁸⁸ Paul, S. E., Hatoum, A. S., Fine, J. D., Johnson, E. C., Hansen, I., Karcher, N. R., Moreau, A. L., Bondy, E., Qu, Y., Carter, E. B., Rogers, C. E., Agrawal, A., Barch, D. M. & Bogdan, R. 2021. Associations Between Prenatal Cannabis Exposure and Childhood Outcomes: Results From the ABCD Study. *JAMA Psychiatry*, 78, 64–76.

⁸⁹ EMCDDA 2023. [Cannabis Laws in Europe](#). Luxembourg: Publications Office of the European Union.

⁹⁰ Allebeck, P. 2019. Cannabis: harmless recreation or dangerous drug? *Eur J Public Health*, 29, 387.

use⁹¹. A study on Europeans' attitudes found that support for legalisation is significantly lower in young people compared to older people in a multivariate analysis which controlled for personal cannabis use⁹².

Against this, two current legal addictive drugs, alcohol and tobacco, cause devastating levels of harm, and widen health inequalities^{93 94 95}. Alcohol alone is responsible for many more deaths than all illegal drugs combined, causing one million deaths each year in Europe⁹⁶. In spite of the 'safe supply' of alcohol, with clear labelling of strength and purity, it causes substantial numbers of accidental poisoning deaths across Europe⁹⁷.

The legal status of both alcohol and tobacco has facilitated a great deal of intrusion by corporations into public policy⁹⁸. Their activities have generally worked against public health. The same can be expected from the cannabis industry⁹⁹. In North America, already now the commercial priorities appear to be the dominant drivers behind the emerging cannabis policies^{100 101 102}.

2.2 Experiences from North America

In Canada and the United States, there are substantial challenges in assessing the impact of legalisation. Legalisation is generally being superimposed upon existing "medical cannabis" regimes which are vastly more liberal than those which exist in Europe, and these medical cannabis markets appear to function as de facto legalisation in many locations¹⁰³. Most studies work on the assumption that legalisation has no impact until the actual date of policy implementation, which typically occurs after a few years of planning. Consumers and others

⁹¹ Chiu, V., Hall, W., Chan, G., Hides, L. & Leung, J. 2022. A Systematic Review of Trends in US Attitudes toward Cannabis Legalization. *Substance Use & Misuse*, 57, 1052–1061.

⁹² Mongan, D., Millar, S. R., O'dwyer, C., Galvin, B. & Smyth, B. P. 2023. Trends in public attitudes to permitting cannabis for recreational use: analysis of Irish survey data since 2002. *European journal of public health*, ckad054.

⁹³ Murray, C. J., Aravkin, A. Y., Zheng, P., Abbafati, C., Abbas, K. M., Abbasi-Kangevari, M., Abd-Allah, F., Abdelalim, A., Abdollahi, M. & Abdollahpour, I. 2020. Global burden of 87 risk factors in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *The lancet*, 396, 1223–1249.

⁹⁴ Smith, K. & Foster, J. 2014. *Alcohol, Health Inequalities and the Harm Paradox: Why some groups face greater problems despite consuming less alcohol*. London: Institute of Alcohol Studies.

⁹⁵ Adler, N. E., Glymour, M. M. & Fielding, J. 2016. Addressing social determinants of health and health inequalities. *Jama*, 316, 1641–1642.

⁹⁶ Bhala, N. B. 2022. Alcohol-related harms and the certainty of deaths and taxes. *The Lancet Regional Health–Europe*, 15.

⁹⁷ Eurosafe 2011. *Alcohol and Injuries: Policy Briefing 5* European Association for Injury Prevention and Safety Promotion.

⁹⁸ Kickbusch, I., Allen, L. & Franz, C. 2016. The commercial determinants of health. *The Lancet Global Health*, 4, e895–e896.

⁹⁹ Connor, J. P., Stjepanović, D., Le Foll, B., Hoch, E., Budney, A. J. & Hall, W. D. 2021. Cannabis use and cannabis use disorder. *Nature Reviews Disease Primers*, 7, 16.

¹⁰⁰ Young-Wolff, K. C., Pacula, R. L. & Silver, L. D. California cannabis markets—why industry-friendly regulation is not good public health. *JAMA health forum*, 2022. American Medical Association, e222018–e222018.

¹⁰¹ Barry, R. A. & Glantz, S. A. 2018. Marijuana Regulatory Frameworks in Four US States: An Analysis Against a Public Health Standard. *Am J Public Health*, 108, 914–923.

¹⁰² Hall, W., Stjepanović, D., Caulkins, J., Lynskey, M., Leung, J., Campbell, G. & Degenhardt, L. 2019. Public health implications of legalising the production and sale of cannabis for medicinal and recreational use. *The Lancet*, 394, 1580–1590.

¹⁰³ Humphreys, K. & Shover, C. L. 2020. Recreational cannabis legalization presents an opportunity to reduce the harms of the US medical cannabis industry. *World Psychiatry*, 19, 191–192.

alter their behaviour once government announces plans to legalise^{104 105 106}. For this reason, the 3–4-year period before formal legalisation should not be used as a baseline when assessing legalisation impacts and these years are more accurately viewed as being part of the legalisation process^{107 108}.

Against the background of incremental liberalisation of cannabis policy in North America, morbidity related to CUD has reached extremely high levels by global standards. According to a Global Burden of Disease examination of CUD, the highest age-standardised rate of DALYs and age-standardised prevalence rate globally in 2019 were in Canada and the USA respectively¹⁰⁹.

Legalisation in Canada came with the promise of keeping cannabis out of the hands of children, improving public health and displacing the black market¹¹⁰. Assessed by its own ambitions, it seems to have broadly failed to deliver on these goals¹¹¹.

The data from Canada and the United States indicates that cannabis use among youth has not declined. It has remained at the extremely high levels it reached during the period of liberal access to “medical” cannabis¹¹². There is some evidence of increase in adolescent cannabis use disorder in the United States following legalisation¹¹³. The prevalence of daily cannabis use by 16-year-olds in the United States increased six-fold from 1991 to 2019, from 0.8% to 4.8%.¹¹⁴ In contrast, In Europe it has increased very marginally among 16-year-olds from ~0.5% in 1995 to

¹⁰⁴ Smyth, B. P. & McCarron, P. 2023. Increase in cannabis-related emergency department presentations in the period immediately before legalization requires explanation. *Addiction*, 118, 979–980.

¹⁰⁵ Myran, D. T., Pugliese, M., Tanuseputro, P. & Taljaard, M. 2023a. Response to Smyth & McCarron: Increases in cannabis-attributable emergency department visits during different phases of the pre- and post-legalization period are multi-factorial. *Addiction*, 118, 980–982.

¹⁰⁶ Imtiaz, S., Nigatu, Y. T., Ali, F., Douglas, L., Hamilton, H. A., Rehm, J., Rueda, S., Schwartz, R. M., Wells, S. & Elton-Marshall, T. 2023. Cannabis legalization and cannabis use, daily cannabis use and cannabis-related problems among adults in Ontario, Canada (2001–2019). *Drug and Alcohol Dependence*, 109765.

¹⁰⁷ Smyth, B. P. & McCarron, P. 2023. Increase in cannabis-related emergency department presentations in the period immediately before legalization requires explanation. *Addiction*, 118, 979–980.

¹⁰⁸ Imtiaz, S., Nigatu, Y. T., Ali, F., Douglas, L., Hamilton, H. A., Rehm, J., Rueda, S., Schwartz, R. M., Wells, S. & Elton-Marshall, T. 2023. Cannabis legalization and cannabis use, daily cannabis use and cannabis-related problems among adults in Ontario, Canada (2001–2019). *Drug and Alcohol Dependence*, 109765.

¹⁰⁹ Shao, H., Du, H., Gan, Q., Ye, D., Chen, Z., Zhu, Y., Zhu, S., Qu, L., Lu, J., Li, Y., Duan, J., Gu, Y. & Chen, M. 2023. Trends of the Global Burden of Disease Attributable to Cannabis Use Disorder in 204 Countries and Territories, 1990–2019: Results from the Disease Burden Study 2019. *Int J Ment Health Addict*, 1–23.

¹¹⁰ Boury, H., Hall, W. & Fischer, B. 2022. Developments and Changes in Primary Public Health Outcome Indicators Associated with the Legalization of Non-Medical Cannabis Use and Supply in Canada (2018): A Comprehensive Overview. *International Journal of Mental Health and Addiction*, 1–15.

¹¹¹ Hall, W., Stjepanović, D., Dawson, D., & Leung, J. (2023). The implementation and public health impacts of cannabis legalization in Canada: a systematic review. *Addiction*.

¹¹² Smyth, B. P. & Cannon, M. 2021. Cannabis legalization and adolescent cannabis use: explanation of paradoxical findings. *Journal of Adolescent Health*, 69, 14–15.

¹¹³ Cerdá, M., Mauro, C., Hamilton, A., Levy, N. S., Santaella-Tenorio, J., Hasin, D., Wall, M. M., Keyes, K. M. & Martins, S. S. 2020. Association between recreational marijuana legalization in the United States and changes in marijuana use and cannabis use disorder from 2008 to 2016. *JAMA psychiatry*, 77, 165–171.

¹¹⁴ Johnston, L. D., Miech, R. A., O’Malley, P. M., Bachman, J. G., Schulenberg, J. E. & Patrick, M. E. 2021. Monitoring the Future national survey results on drug use 1975–2020: 2020 Overview. Key findings on adolescent drug use. . Ann Arbor: Institute for Social Research, University of Michigan.

0.8% in 2019¹¹⁵. In Canada, the prevalence of daily cannabis use among 16 to 19-year-olds was 9% in 2020¹¹⁶.

In spite of the challenges of conducting evaluations of legalisation impacts noted above, there is some evidence of increases in rates of intensive and harmful use in legal locations^{117 118 119}. The US Household Survey indicates that prevalence of daily use by adults increased 10-fold from 1992 to 2021, while past year use doubled. Daily use by adults in Canada increased six-fold across the period of cannabis policy liberalisation and ultimate legalisation, from 2000 to 2019¹²⁰. There was a significant acceleration in daily and harmful use patterns following the announcement of government plans to legalise in Canada, and this increased further following actual legalisation¹²¹.

Cannabis commercialisation has been associated with increases in cannabis related emergency department attendances^{122 123 124 125 126}. A study of Cannabinoid Hyperemesis Syndrome cases in EDs in Canada noted a 13-fold increase in presentations across the period from 2014 to 2021¹²⁷. ED presentations for cannabis-induced psychosis doubled between 2015 and 2019¹²⁸. While the trend change was not statistically significant, it is a large and unexplained change that is of clinical significance and warrants some concern. There was an increase in cannabis induced psychosis in EDs from 2020 after cannabis commercialisation¹²⁹. While a legal and regulated

¹¹⁵ Espad Group 2020. [Espad Report 2019: Additional Tables](#). Luxembourg.

¹¹⁶ Health Canada. 2020. [Canadian Cannabis Survey 2020: Summary](#).

¹¹⁷ Imtiaz, S., Nigatu, Y. T., Ali, F., Douglas, L., Hamilton, H. A., Rehm, J., Rueda, S., Schwartz, R. M., Wells, S. & Elton-Marshall, T. 2023. Cannabis legalization and cannabis use, daily cannabis use and cannabis-related problems among adults in Ontario, Canada (2001–2019). *Drug and Alcohol Dependence*, 109765.

¹¹⁸ Hasin, D. S. 2023. The epidemiology of cannabis use and cannabis use disorder. In: D'SOUZA, D., CASTLE, D. & MURRAY, R. M. (eds.) *Marijuana and Madness*. 3rd ed. Cambridge: Cambridge University Press.

¹¹⁹ Kilmer, J. R., Rhew, I. C., Guttmanova, K., Fleming, C. B., Hultgren, B. A., Gilson, M. S., Cooper, R. L., Dille, J. & Larimer, M. E. 2022. Cannabis use among young adults in Washington State after legalization of nonmedical cannabis. *American journal of public health*, 112, 638–645.

¹²⁰ Imtiaz, S., Nigatu, Y. T., Ali, F., Douglas, L., Hamilton, H. A., Rehm, J., Rueda, S., Schwartz, R. M., Wells, S. & Elton-Marshall, T. 2023. Cannabis legalization and cannabis use, daily cannabis use and cannabis-related problems among adults in Ontario, Canada (2001–2019). *Drug and Alcohol Dependence*, 109765.

¹²¹ Ibid.

¹²² Myran, D. T., Roberts, R., Pugliese, M., Taljaard, M., Tanuseputro, P. & Pacula, R. L. 2022b. Changes in Emergency Department Visits for Cannabis Hyperemesis Syndrome Following Recreational Cannabis Legalization and Subsequent Commercialization in Ontario, Canada. *JAMA Netw Open*, 5, e2231937.

¹²³ Myran, D. T., Pugliese, M., Tanuseputro, P., Cantor, N., Rhodes, E. & Taljaard, M. 2022a. The association between recreational cannabis legalization, commercialization and cannabis-attributable emergency department visits in Ontario, Canada: an interrupted time-series analysis. *Addiction*, 117, 1952–1960.

¹²⁴ Wolf, L. A., Perhats, C., Clark, P. R., Frankenberger, W. D. & Moon, M. D. 2020. The perceived impact of legalized cannabis on nursing workload in adult and pediatric emergency department visits: A qualitative exploratory study. *Public Health Nurs*, 37, 5–15.

¹²⁵ Myran, D. T., Tanuseputro, P., Auger, N., Konikoff, L., Talarico, R. & Finkelstein, Y. 2022c. Edible Cannabis Legalization and Unintentional Poisonings in Children. *N Engl J Med*, 387, 757–759.

¹²⁶ Hall, W., Stjepanović, D., Dawson, D., & Leung, J. (2023). The implementation and public health impacts of cannabis legalization in Canada: a systematic review. *Addiction*.

¹²⁷ Myran, D. T., Roberts, R., Pugliese, M., Taljaard, M., Tanuseputro, P. & Pacula, R. L. 2022b. Changes in Emergency Department Visits for Cannabis Hyperemesis Syndrome Following Recreational Cannabis Legalization and Subsequent Commercialization in Ontario, Canada. *JAMA Netw Open*, 5, e2231937.

¹²⁸ Callaghan, R. C., Sanches, M., Murray, R. M., Konefal, S., Maloney-Hall, B. & Kish, S. J. 2022. Associations Between Canada's Cannabis Legalization and Emergency Department Presentations for Transient Cannabis-Induced Psychosis and Schizophrenia Conditions: Ontario and Alberta, 2015–2019. *The Canadian Journal of Psychiatry*, 67, 616–625.

¹²⁹ Myran, D.T., Pugliese, M., Roberts, R.L. et al. 2023c [Association between non-medical cannabis legalization and emergency department visits for cannabis-induced psychosis](#). *Mol Psychiatry*.

product may be lower risk in terms of causing an adverse event, that benefit is more than offset if legalisation itself results in big increases in episodes of use.

There has been a consistent pattern of increases in paediatric presentations to emergency departments in locations which have legalised cannabis^{130 131 132 133 134}. These appear to be largely related to cannabis edible products in younger children^{135 136}.

A surprising feature of legalisation to date has been the robust nature of the black market. It continues to thrive in legal locations, where it retains 40–70% of the overall market^{137 138}. It has resulted in an apparent competition between the legal and illegal producers, which has driven potency up and costs downward^{139 140}. The youngest, poorest and most dependent cannabis users can be expected to gravitate towards this illegal market, as they are the most price sensitive^{141 142}.

Looked at broadly, there is a substantial reason to be concerned that legalisation has a range of adverse health impacts based upon this experience in North America¹⁴³. There is no real evidence of any health benefits. This explains why the American Medical Association¹⁴⁴ believes that cannabis should not be legalised. The American Academy of Pediatrics¹⁴⁵ and a number of State Medical Societies have also voiced their opposition to cannabis legalisation¹⁴⁶.

¹³⁰ Callaghan, R. C., Sanches, M., Vander Heiden, J. & Kish, S. J. 2023. Impact of Canada's cannabis legalisation on youth emergency department visits for cannabis-related disorders and poisoning in Ontario and Alberta, 2015–2019. *Drug and alcohol review*.

¹³¹ Ryan, S. A. 2021. Unintended but Hardly Unexpected Consequences of Cannabis Legalization. *Pediatrics*, 148.

¹³² Yeung, M. E. M., Weaver, C. G., Hartmann, R., Haines-Saah, R. & Lang, E. 2021. Emergency Department Pediatric Visits in Alberta for Cannabis After Legalization. *Pediatrics*, 148.

¹³³ Myran, D. T., Tanuseputro, P., Auger, N., Konikoff, L., Talarico, R. & Finkelstein, Y. 2022c. Edible Cannabis Legalization and Unintentional Poisonings in Children. *N Engl J Med*, 387, 757–759.

¹³⁴ Hall, W., Stjepanović, D., Dawson, D., & Leung, J. (2023). The implementation and public health impacts of cannabis legalization in Canada: a systematic review. *Addiction*.

¹³⁵ Myran, D. T., Tanuseputro, P., Auger, N., Konikoff, L., Talarico, R. & Finkelstein, Y. 2022c. Edible Cannabis Legalization and Unintentional Poisonings in Children. *N Engl J Med*, 387, 757–759.

¹³⁶ Roth, W., Tam, M., Bi, C., Kim, J., Lewis, J., Ho, R. & Apollonio, D. E. 2022. Changes in California cannabis exposures following recreational legalization and the COVID-19 pandemic. *Clin Toxicol (Phila)*, 60, 632–638.

¹³⁷ HIDTA, R. M. 2019. Legalization Of Marijuana In Colorado: The Impact. Rocky Mountain Hidta.

¹³⁸ Armstrong, M. J. 2021. Legal cannabis market shares during Canada's first year of recreational legalisation. *International Journal of Drug Policy*, 88, 103028.

¹³⁹ Tassone, F., Di Ciano, P., Liu, Y. & Rueda, S. 2023. On offer to Ontario consumers three years after legalization: A profile of cannabis products, cannabinoid content, plant type, and prices. *Front Psychiatry*, 14, 1111330.

¹⁴⁰ Hall, W. & Lynskey, M. 2020. Assessing the public health impacts of legalizing recreational cannabis use: the US experience. *World Psychiatry*, 19, 179–186.

¹⁴¹ Wadsworth, E., Driezen, P., Pacula, R. L. & Hammond, D. 2022. Cannabis flower prices and transitions to legal sources after legalization in Canada, 2019–2020. *Drug Alcohol Depend*, 231, 109262.

¹⁴² Hawke, L. D. & Henderson, J. 2021. Legalization of cannabis use in Canada: Impacts on the cannabis use profiles of youth seeking services for substance use. *J Subst Abuse Treat*, 126, 108340.

¹⁴³ Hall, W., Stjepanović, D., Dawson, D., & Leung, J. (2023). The implementation and public health impacts of cannabis legalization in Canada: a systematic review. *Addiction*.

¹⁴⁴ American Medical Association. 2020. [Cannabis Legalization for Adult Use \(commonly referred to as recreational use\) H-95.924](#) [Online].

¹⁴⁵ American Academy Of Pediatrics. 2015. The impact of marijuana policies on youth: clinical, research, and legal update. *Pediatrics*, 135, 584–587.

¹⁴⁶ MSSNY. 2020. [State Medical Societies Concerned with State Governments' Efforts to Legalize Recreational Marijuana](#) [Online]. New York: Medical Society of the State of New York.

The United Nations International Narcotics Control Board points out in its 2022 report that current evidence from jurisdictions where cannabis has been legalised for recreational use show a higher consumption of cannabis and an increase in adverse health effects, psychotic disorders, and a negative impact on road safety¹⁴⁷.

The concern and caution expressed by doctors and other health experts has been drowned out by sophisticated and very well-funded legalisation campaigns. The Canadian cannabis corporations now attract major funding from the other addiction industries, big alcohol and big tobacco¹⁴⁸. They are now active in lobbying and advocating for cannabis legalisation in Europe.

Some European countries have begun to experiment with alternate models of deterring use, generally involving less severe and less intrusive sanctions¹⁴⁹. Decriminalisation constitutes a policy response whereby cannabis use remains an offence, but the sanction imposed is a non-criminal one, such as a fine¹⁵⁰. Portugal has adopted a novel form of decriminalisation which uses referral to a dissuasion commission for people found by the police to be using cannabis. The person is mandated to attend an assessment with professionals regarding their use¹⁵¹. While mainstream media and many politicians confuse decriminalisation and legalisation, they are fundamentally different¹⁵². Drug use remains an offence under decriminalisation. There is a risk that cannabis use could increase slightly in a society which moves to a lesser sanction^{153 154 155}. This risk could theoretically be off-set by prompt and consistent responses to detections of use¹⁵⁶.

¹⁴⁷ INCB, [Legalized non-medical use of cannabis leads to higher consumption, more health concerns and does not reduce criminal activity](#). United Nations International Narcotics Control Board, Report 2022.

¹⁴⁸ Connor, J. P., Stjepanović, D., Le Foll, B., Hoch, E., Budney, A. J. & Hall, W. D. 2021. Cannabis use and cannabis use disorder. *Nature Reviews Disease Primers*, 7, 16.

¹⁴⁹ EMCDDA 2023. [Cannabis Laws in Europe](#). Luxembourg: Publications Office of the European Union.

¹⁵⁰ EMCDDA. 2015. [Motion graphic: What is decriminalisation of drugs?](#) [Online].

¹⁵¹ Laqueur, H. 2015. Uses and abuses of drug decriminalization in Portugal. *Law & Social Inquiry*, 40, 746–781.

¹⁵² EMCDDA. 2015. [Motion graphic: What is decriminalisation of drugs?](#) [Online].

¹⁵³ Benedetti, E., Resce, G., Brunori, P. & Molinaro, S. 2021. Cannabis policy changes and adolescent cannabis use: Evidence from Europe. *International Journal of Environmental Research and Public Health*, 18, 5174.

¹⁵⁴ Williams, J. & Bretteville-Jensen, A. L. 2014. Does liberalizing cannabis laws increase cannabis use? *J Health Econ*, 36, 20–32.

¹⁵⁵ Smyth, B. P., Davey, A. & Keenan, E. 2023. Deterrence effect of penalties upon adolescent cannabis use. *Ir J Psychol Med*, 1–6.

¹⁵⁶ Pacula, R. L. & Sevigny, E. L. 2014. Marijuana liberalization policies: why we can't learn much from policy still in motion. *J Policy Anal Manage*, 33, 212–21.

Summary

In summary, cannabis is a drug with many hazards. Risks are heightened for adolescents in particular. For these reasons, it is appropriate that Europe continues to make efforts to reduce cannabis use by citizens. There is current evidence of substantial health harms related to cannabis use across Europe. The weight of current evidence indicates that legalisation adds to health harms across the population. Therefore, European doctors strongly oppose the further legalisation of cannabis. Commercialisation of cannabis is a particular threat, in light of public health experience with currently legal addictive drugs. Experience with alcohol in particular has taught that the political system has enormous difficulty keeping public health priorities in mind when faced with lobbying by commercial actors.

There is a need to ensure that the people in Europe, especially youth, are fully aware of the many risks associated with cannabis use. There is a need to develop comprehensive addiction treatment response for the many Europeans who currently have a cannabis use disorder.