

## The impact of the COVID-19 pandemic on addictive disorders – an update

Word count: 1,429

### Authors:

John Marsden, Kings College London, London, UK

Jamie Brown, University College London, London, UK

Luke Clark, University of British Columbia, Vancouver, British Columbia, Canada

Janna Cousijn, University of Amsterdam, Amsterdam, the Netherlands

Wayne Hall, University of Queensland, Brisbane, QLD, Australia

Matt Hickman, Bristol University, Bristol, UK

John Holmes, Sheffield University, Sheffield, UK

Keith Humphreys, Veterans Affairs and Stanford University Medical Centers, Palo Alto, CA, USA

Sarah E. Jackson, University College London, London, UK

Amy Peacock, University of New South Wales, Sydney, NSW, Australia

Jalie Tucker, University of Florida, Gainesville, FL, USA

**Corresponding author:** John Marsden, [john.marsden@kcl.ac.uk](mailto:john.marsden@kcl.ac.uk)

**Key words:** Addictive disorders, COVID-19, public health, public health policy, research, treatment

### Declaration of interests:

In the past three years, JM declares research grants from the National Institute for Health Research (NIHR; randomised controlled trial of depot naltrexone for OUD, and a randomised controlled trial of acamprosate for alcohol use disorder); and the NIHR Biomedical Research Centre for Mental Health at South London and Maudsley NHS Mental Health Foundation Trust (SLaM; randomised controlled trial of novel cognitive therapy for cocaine use disorder). He has part-time employment as Senior Academic Advisor for the Alcohol, Drugs, Tobacco and Justice Division, Health and Wellbeing Directorate, Public Health England and is a clinical academic consultant for the US National Institute on Drug Abuse, Centre for Clinical Trials Network. JM declares an unrestricted research grant at IoPPN and SLaM from Indivior via Action on Addiction for the present study and unrestricted research grant funding at IoPPN and SLaM from Indivior for a three-year, multi-centre, randomised controlled trial of injectable depot buprenorphine (from 2019). He has received honoraria and travel support from PCM Scientific and Martindale for the Improving Outcomes in Treatment of Opioid Dependence conference (2018). He holds no stocks in any company

JB works at University College London and is funded by CRUK. His research is predominantly funded by various research councils, UK government agencies and charities (e.g., CRUK, SSA, NPRI, NIHR and UK Department of Health). He has previously received unrestricted research funding relating to smoking cessation from the pharmaceutical

company Pfizer, which manufactures smoking cessation medicines. He has never received personal fees or research funding from alcohol, e-cigarette or tobacco companies.

LC is employed by the University of British Columbia, where he is the Director of the Centre for Gambling Research at UBC. The Centre is funded by the Province of British Columbia government and the British Columbia Lottery Corporation (BCLC), a Canadian Crown Corporation. He holds further research funding from the Natural Sciences and Engineering Research Council of Canada, and the British Columbia Ministry of Finance. He has received speaker travel reimbursements from the National Association of Gambling Studies (Australia), the National Center for Responsible Gaming (US), and Alberta Gambling Research Institute (Canada), and reviewer honoraria from the National Center for Responsible Gaming (US) and Gambling Research Exchange Ontario (Canada). He has not received any further direct or indirect payments from the gambling industry or groups substantially funded by gambling. He has received royalties from Cambridge Cognition Ltd. from the licensing of a neurocognitive test.

JC holds a full-time appointment at the University of Amsterdam, Department of Psychology. Her research has been supported by grants from the US National Institute of Health (NIH-NIDA); National Science Foundation, Netherlands (NWO); The Netherlands Organisation for Health Research and Development (ZON-MW); and intramural funding from different Dutch universities. She has no financial conflicts of interest to declare.

In the past five years, WH has not received fees or funding of any kind from alcohol, pharmaceutical or tobacco companies. His research funding has been from the Australia Research Council and the National Health and Medical Research Council of Australia. He received fees for preparing a literature review of the adverse health effects of cannabis from WHO (2016) and fees for reviewing evidence on the medical benefits of cannabis from: the Therapeutic Goods Administration of Australia (2017-2018); the EMCDDA (2018); and the International Narcotics Control Board (2018).

MH holds a full-time post at Population Health Sciences, Bristol Medical School, University of Bristol. MH has never received any funding from alcohol or tobacco companies but has received unrestricted research grants as co-investigator and speaker fees from pharmaceutical companies and has received funds from charities with an interest in Addiction. MH has no connection to any patents, copyrights or businesses relating to the addiction field. MH is PI on multiple research grants held at University of Bristol which are in the field of addiction.

JH has no institutional or other associations which he believes cause a conflict of interest. He has not received any funds (direct or indirect) from the alcohol, tobacco or gambling industries, although he has received funding related to commissioned research from Systembolaget, the Swedish government-owned alcohol retail monopoly and Alko, its Finnish equivalent. His research is funded by grants, commissions and consultancy projects from research councils, medical charities and UK or international government bodies. He has also received monies to cover travel and subsistence expenses relating to speaking engagements from public and charitable bodies. He has received personal payments from the Western Australian Government (for a report on alcohol pricing policy) and from other public and charitable bodies for peer review activities.

KH receives salary support as a civil servant in the U.S. Department of Veterans Affairs and as a Professor at Stanford University, a private non-profit educational institution. He has received grants from government sources and from non-profit foundations, but has never received grants, honoraria or consulting fees from the tobacco, alcohol, cannabis, or

gambling industries. He is a paid, non-stock holding, scientific advisor to Aelis Farma, a company which is attempting to develop CB1 receptor inhibitors. He has accepted travel costs and speaking fees from professional societies and reviewing fees from academic publishers. He has no institutional affiliations or society memberships which he believes could reasonably be construed as potentially constituting conflict of interest. He is open to further enquiry from any reader of the journal who might wish to question him.

SEJ has no conflicts of interest to declare.

In the past three years, AP has received untied educational grants from Seqirus for post-marketing surveillance of an opioid formulation marketed by this company in Australia, and has received funding from the Australian National Health and Medical Research Council, the Australian Government Department of Health, the European Monitoring Centre for Drugs and Drug Addiction, United Nations Office on Drugs and Crime, and The Global Fund.

JT receives salary support as a fulltime faculty member at the University of Florida, Gainesville and as a part-time faculty member at the University of Alabama at Birmingham. Her research has been supported by grants from the U.S. National Institutes of Health (NIAAA and NIDA) and the U.S. Centers for Disease Control and Prevention. She has received book royalties from Guilford Publications and has accepted travel reimbursement and honoraria from universities, research centers, professional societies, health care organizations, and the NIH for presentations, reviews, and consulting on topics related to research and practice. She has never received support from industry sources such as pharmaceutical, alcohol, or tobacco companies. She has no institutional or professional affiliations or society memberships that she believes could be construed as creating a conflict of interest with her responsibilities as a member of the editorial staff of Addiction.

*Overall, the early phases of the pandemic were not associated with more consumption of opioids, alcohol, cannabis and involvement in gambling, but there has been evidence for an increase in addictive behaviours among specific groups. Tobacco use stands somewhat apart with evidence of both increased quitting and more initiation. Natural experiments and other longitudinal research studies are needed to estimate lasting change.*

Over two years ago, several of us voiced concern that the COVID-19 pandemic and its associated public health prevention and control measures would be likely to affect disproportionately people with addictive disorders [1]. The scope of research that followed was mainly restricted to higher income countries, but its volume has been astonishing. COVID-19 will continue to cast a long shadow, but we judged it timely to revisit the question of its impact on addictive disorders and summarise what happened.

## **OPIOIDS**

Latest drug seizure data reports suggest that the supply of illicit opioids remained stable with some short-term localised disruptions [2], and surveys of people who use opioids have reported that consumption patterns generally have not been affected [3]. Administrative data on OUD treatment showed a decline in service use after the pandemic restrictions, with the rate of new treatment admissions increasing after removal of these measures but below pre-pandemic levels [4,5]. Nevertheless, there is evidence that people with OUD have had higher rates of COVID-19 infection and worsened health outcomes [6]. Hospital cases of opioid overdose increased during March–October 2020 [7], and fatal opioid and other drug poisonings have increased for the year [8].

Pragmatic and rapidly instituted changes to OUD treatment and related services, including dispensing of opioid agonist medications for up to 14 days for self-administration [9], the adoption or expansion of telehealth delivery [10], and practice changes by syringe service programmes [11] appear to have been successful and well-received by service users [12] with minimal evidence of service interruption [13] and with no concerns for an increase in opioid-related overdose [13,14].

## **ALCOHOL**

Following the closure of bars and restaurants, in the United States retail alcohol sales increased significantly [15], and in Canada there was evidence of stockpiling during the first 16 months of the pandemic [16]. Overall, there does not seem to be evidence for an overall increase in alcohol consumption: a meta-analysis of 128 studies from 58 countries reported that an equal proportion of participants (23%) reported drinking more or drinking less [17]. However, during 2019–2020, alcohol-specific mortality increased by 19% and 26% in the United Kingdom and United States, respectively [18,19]. This increase may reflect a general reduction in access to healthcare services and an increase in consumption in higher risk groups [20]. Restrictions on the availability of alcohol might have been expected to reduce interpersonal violence and public order offences, but findings to date indicate that, irrespective of any changes in overall alcohol-attributable violence, domestic violence increased [21].

## **CANNABIS**

Research has painted a mixed picture of the impact of the pandemic on cannabis use (see Chong and colleagues for a scoping review [22]). In Canada, a time series analysis of the legal sale of cannabis concluded that there was a continuation of the same rate of increase

in sales that had been evident before the pandemic [23]. Cohort studies of adolescents and young adults that compared self-reported cannabis use in survey waves conducted before and during the pandemic reported very little change in consumption patterns [24,25]. However, a different picture was observed in opportunistic surveys of people who use cannabis regularly. Here, the frequency and quantity of cannabis use *increased* during lockdowns and other social distancing restrictions [26,27,28,29].

## **TOBACCO**

The ITC Four Country survey conducted in April–June 2020 in Australia, Canada, England, and the United States reported that 47% of current smokers had considered quitting because of COVID-19 [30]. Roughly equal proportions reported having reduced (14%) or increased (15%) the amount they smoked since the coronavirus outbreak, but there was substantial between-country variation: smokers in Australia were less likely than those in England, Canada, or the United States to have tried to quit or reduce their smoking. It is possible that this was attributable to the substantially lower impact of COVID-19 in Australia during the early stages of the pandemic. In England, during March–July 2020, a representative monthly cross-sectional survey reported a surge in quitting activity among smokers during the first national lockdown, but also a 25% increase in smoking prevalence among young adults aged 18–34 years (from 22% to 27%) [31].

By July 2021, 547 studies had assessed the association between tobacco use and COVID-19 [32,33]. Contrary to expectations, compared with never smokers, current smokers appear to have been at reduced risk of infection but at increased risk of greater in-hospital disease severity. On the other hand, former smokers appear to have been at increased risk of hospitalisation, greater in-hospital disease severity and mortality from COVID-19. It is not known whether these associations are causal.

## **GAMBLING**

A systematic review of 17 studies conducted during March – May 2020 in Europe, North America, Australasia, and Israel showed that all studies reported overall decreases in gambling, which nonetheless masked an increase among a subset of individuals who were migrating to online gambling and experiencing increased gambling-related harm [34]. In at least one study, these vulnerable individuals had higher pre-pandemic levels of gambling problems and lower income [35]. The majority of studies were cross-sectional online surveys, but findings converged with analyses of tax revenues from gambling operators [36], behavioural tracking of online gamblers [37], and calls to gambling telephone helplines [38].

As the pandemic evolved, there were rapid changes in the regulatory and technological landscape that may affect problem gambling. Several jurisdictions in North America witnessed a marked expansion of sports betting also tied to federal and state rulings that allowed its expansion [39]. There was a popularisation of trading apps during the pandemic and evidence that people with gambling problems were drawn to high frequency and daily trading opportunities [40]. The global move away from cash transactions during the pandemic led some jurisdictions to consider ‘cashless casinos’ that allowed patrons to play a slot machine using card-based payment [41]. The suspension of land-based gambling and sports in the early lockdown may also have invigorated formerly niche activities such as e-sports betting [42].

## **CONCLUSIONS**

In the context of country variation, research to date suggests the consumption of opioids and alcohol did not change during the early phases of the pandemic but population levels of

mortality *did* increase, probably reflecting increased use among high-risk groups. This was also seen for cannabis and gambling, where at-risk and regular consumers increased their consumption during lockdowns and other restrictions. Tobacco use stands somewhat apart, with evidence of both increased quitting and more initiation. At this point in understanding the effects of the pandemic, studies on harms are needed among people who use stimulant drugs such as cocaine and methamphetamine and have underlying respiratory or cardiovascular disease. It was always going to be hard to isolate pandemic-specific effects from other exposures and underlying population trends. We hope that natural experiments and longitudinal studies will show whether the pandemic has had a lasting impact.

## REFERENCES

---

1. Marsden J, Darke S, Hall W, Hickman M, Holmes J, Humphreys K, Neale J, Tucker J, West R. Mitigating and learning from the impact of COVID-19 infection on addictive disorders. *Addiction* 2020. 115, Issue 6 p. 1007-1010  
<https://doi.org/10.1111/add.15080>
2. UNODC, World Drug Report 2022, United Nations publication, 2022. Accessed at: <https://www.unodc.org/unodc/en/data-and-analysis/world-drug-report-2022.html>.
3. Peacock A, Price O, Karlsson A, Uporova J, Chan R, Swanton R, et al. Impact of COVID-19 and associated restrictions on people who inject drugs in Australia: Findings from the Illicit Drug Reporting System 2020. *Drug Trends Bulletin Series*. Sydney: National Drug and Alcohol Research Centre, UNSW Sydney; 2020.
4. Trayner KMA, McAuley A, Palmateer NE, Yeung A, Goldberg DJ, Glancy M, et al. Examining the impact of the first wave of COVID-19 and associated control measures on interventions to prevent blood-borne viruses among people who inject drugs in Scotland: an interrupted time series study. *Drug and Alcohol Dependence*. 2022;232:109263.
5. Tilhou AS, Dague L, Saloner B, Beemon D, Burns M. Trends in engagement with opioid use disorder treatment among Medicaid beneficiaries during the COVID-19 pandemic. *JAMA Health Forum*. 2022;3(3):e220093-e.
6. Wang QQ, Kaelber DC, Xu R, Volkow ND. COVID-19 risk and outcomes in patients with substance use disorders: analyses from electronic health records in the United States. *Molecular Psychiatry*. 2021;26(1):30-9.
7. Holland KM, Jones C, Vivolo-Kantor AM, Idaikkadar N, Zwald M, Hoots B, et al. Trends in US Emergency Department Visits for Mental Health, Overdose, and Violence Outcomes Before and During the COVID-19 Pandemic. *JAMA Psychiatry*. 2021;78(4):372-9.
8. Imtiaz S, Nafeh F, Russell C, Ali F, Elton-Marshall T, Rehm J. The impact of the novel coronavirus disease (COVID-19) pandemic on drug overdose-related deaths in the United States and Canada: a systematic review of observational studies and analysis of public health surveillance data. *Substance Abuse Treatment, Prevention, and Policy*. 2021;16(1):87.
9. Department of Health and Social Care, COVID-19: guidance for commissioners and providers of services for people who use drugs or alcohol, 15 April 2020, <https://www.gov.uk/government/publications/covid-19-guidance-for-commissioners->

---

and-providers-of-services-for-people-who-use-drugs-or-alcohol/covid-19-guidance-for-commissioners-and-providers-of-services-for-people-who-use-drugs-or-alcohol.

10. Krawczyk N, Fawole A, Yang J, Tofighi B. Early innovations in opioid use disorder treatment and harm reduction during the COVID-19 pandemic: a scoping review. *Addiction Science & Clinical Practice*. 2021;16(1):68.
11. Glick SN, Prohaska SM, LaKosky PA, Juarez AM, Corcorran MA, Des Jarlais DC. The Impact of COVID-19 on Syringe Services Programs in the United States. *AIDS Behav*. 2020 Sep;24(9):2466-2468. doi: 10.1007/s10461-020-02886-2.
12. Kesten JM, Holland A, Linton M-J, Family H, Scott J, Horwood J, et al. Living Under Coronavirus and Injecting Drugs in Bristol (LUCID-B): A qualitative study of experiences of COVID-19 among people who inject drugs. *International Journal of Drug Policy*. 2021; 98: 103391
13. Gomes T, Campbell TJ, Kitchen SA, et al. Association Between Increased Dispensing of Opioid Agonist Therapy Take-Home Doses and Opioid Overdose and Treatment Interruption and Discontinuation. *JAMA*. 2022;327(9):846–855. doi:10.1001/jama.2022.1271
14. Jones CM, Compton WM, Han B, Baldwin G, Volkow ND. Methadone-Involved Overdose Deaths in the US Before and After Federal Policy Changes Expanding Take-Home Methadone Doses From Opioid Treatment Programs. *JAMA Psychiatry*. Published online July 13, 2022. doi:10.1001/jamapsychiatry.2022.1776
15. Castaldelli-Maia, J. M., Segura, L. E., & Martins, S. S. (2021). The concerning increasing trend of alcohol beverage sales in the U.S. during the COVID-19 pandemic. *Alcohol*, 96, 37-42.
16. MacKillop, J., Cooper, A., & Costello, J. National retail sales of alcohol and cannabis during the COVID-19 pandemic in Canada. *JAMA Network Open*, 2021; 4: (11), e2133076. doi:10.1001/jamanetworkopen.2021.33076
17. Acuff SF, Strickland JC, Tucker JA, Murphy JG. Changes in alcohol use during COVID-19 and associations with contextual and individual difference variables: A systematic review and meta-analysis. *Psychol Addict Behav*. 2022 Feb;36(1):1-19. doi: 10.1037/adb0000796. Epub 2021 Nov 22. PMID: 34807630; PMCID: PMC8831454.
18. ONS. Alcohol-specific deaths in the UK: registered in 2020. 2021 <https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/causesofdeath/bulletins/alcoholrelateddeathsintheunitedkingdom/registeredin2020> accessed 16th December 2021
19. White A. M., Castle I.-J. P., Powell P. A., Hingson R. W., Koob G. F. Alcohol-Related Deaths During the COVID-19 Pandemic, *JAMA* 2022.
20. Holmes J., Meier P. S., Booth A., Guo Y., Brennan A. The temporal relationship between per capita alcohol consumption and harm: A systematic review of time lag specifications in aggregate time series analyses, *Drug Alcohol Depend* 2012: 123: 7-14.

- 
21. Usher, K., Bhullar, N., Durking, J., Gyamfi, N., & Jackson, D. (2020). Family violence and COVID-19: Increased vulnerability and reduced options for support. *International Journal of Mental Health Nursing*, 29(4), 549-552.
  22. Chong, W. W. Y., Acar, Z. I., West, M. L., & Wong, F. (2022). A Scoping Review on the Medical and Recreational Use of Cannabis During the COVID-19 Pandemic. *Cannabis and cannabinoid research*. 2021 Dec 29. doi: 10.1089/can.2021.0054.
  23. Armstrong, M.J., Cantor, N., Smith, B.T., Jesseman, R., Hobin, E., Myran, D.T. Interrupted time series analysis of Canadian legal cannabis sales during the COVID-19 pandemic. *Drug and Alcohol Review*, 2022 22 March 2022 <https://doi.org/10.1111/dar.13465>
  24. Leatherdale, S. T., Bélanger, R. E., Ganssionré, R. J., Patte, K. A., deGroh, M., Jiang, Y., & Haddad, S. (2021). Examining the impact of the early stages of the COVID-19 pandemic period on youth cannabis use: adjusted annual changes between the pre-COVID and initial COVID-lockdown waves of the COMPASS study. *BMC public health*, 21(1), 1-10.
  25. Pocuca, N., London-Nadeau, K., Geoffroy, M. C., Chadi, N., Séguin, J. R., Parent, S., ... & Castellanos-Ryan, N. (2022). Changes in emerging adults' alcohol and cannabis use from before to during the COVID-19 pandemic: Evidence from a prospective birth cohort. *Psychology of Addictive Behaviors*. . 2022 Feb 24. doi: 10.1037/adb0000826.
  26. Assaf, R. D., Gorbach, P. M., & Cooper, Z. D. Changes in medical and non-medical cannabis use among United States adults before and during the COVID-19 pandemic. *The American Journal of Drug and Alcohol Abuse*. 2022; 1-7.
  27. Cousijn, J., Kuhns, L., Larsen, H., & Kroon, E. For better or for worse? A pre–post exploration of the impact of the COVID-19 lockdown on cannabis users. *Addiction*, 116: 2104–2115.
  28. EMCDDA Trendspotter Briefing: Impact of COVID-19 on Patterns of Drug Use and Drug-Related Harms in Europe (2020). Available online: [https://www.emcdda.europa.eu/publications/ad-hoc-publication/impact-covid-19-patterns-drug-use-and-harms\\_en](https://www.emcdda.europa.eu/publications/ad-hoc-publication/impact-covid-19-patterns-drug-use-and-harms_en)
  29. Van Laar, M W., Oomen, P. E., van Miltenburg, C. J. A., Vercoulen, E., Freeman, T.P and Hall, W.D. Cannabis and COVID-19: Reasons for concern. *Frontiers in Psychiatry* 2021, doi: 10.3389/fpsy.2020.601653.
  30. Gravely S, Craig LV, Cummings KM, Ouimet J, Loewen R, Martin N, Chung-Hall J, Driezen P, Hitchman SC, McNeill A, Hyland A, Quah ACK, O'Connor RJ, Borland R, Thompson ME, Boudreau C, Fong GT. Smokers' cognitive and behavioural reactions during the early phase of the COVID-19 pandemic: Findings from the 2020 ITC Four Country Smoking and Vaping Survey. *PLOS ONE*. 2021; 16: e0252427.
  31. Jackson SE, Beard E, Angus A, Field M, Brown J. Moderators of changes in smoking, drinking and quitting behaviour associated with the first COVID-19 lockdown in England. *Addiction*. 2021; 117: 772-783.



- 
32. Simons D, Shahab L, Brown J, Perski O. The association of smoking status with SARS-CoV-2 infection, hospitalization and mortality from COVID-19: a living rapid evidence review with Bayesian meta-analyses (version 7). *Addiction*. 2021; 116):1319–1368.
  33. Simons D, Shahab L, Brown J, Perski O. (2021). The association of smoking status with SARS-CoV-2 infection, hospitalisation and mortality from COVID-19: A living rapid evidence review with Bayesian meta-analyses (version 12). *Qeios*. doi:10.32388/UJR2AW.15
  34. Hodgins DC, Stevens RMG. The impact of COVID-19 on gambling and gambling disorder: emerging data. *Curr Opin Psychiatry*. 2021; 34: 332–343.
  35. Xuereb S, Kim HS, Clark L, Wohl MJA. Substitution behaviors among people who gamble during COVID-19 precipitated casino closures. *Int Gambl Stud [Internet]*. 2021; Available from: <https://doi.org/10.1080/14459795.2021.1903062>.
  36. Håkansson A. Effects on gambling activity from Coronavirus Disease 2019—an analysis of revenue-based taxation of online- and land-based gambling operators during the pandemic. *Front Psychiatry*. 2020; 11: 1–8.
  37. Auer M, Malischnig D, Griffiths MD. Gambling before and during the COVID-19 pandemic among European regular sports bettors: an empirical study using behavioral tracking data. *Int J Ment Health Addict*. 2020.
  38. Turner NE. COVID-19 and gambling in Ontario. *J Gambl Issues*. 2020; 44:1–3.
  39. van der Maas M, Cho SR, Nower L. Problem gambling message board activity and the legalization of sports betting in the US: A mixed methods approach. *Comput Human Behav [Internet]*. 2022; 128:107–133.
  40. Mosenhauer M, Newall PWS, Walasek L. The stock market as a casino: Associations between stock market trading frequency and problem gambling. *J Behav Addict*. 2021;10: 683–689.
  41. Gainsbury SM, Blaszczynski A. Digital Gambling Payment Methods: Harm Minimization Policy Considerations. *Gaming Law Rev*. 2020; 24: 466–472.
  42. Wardle H, Degenhardt L, Ceschia A, Saxena S. The Lancet Public Health Commission on gambling. *Lancet Public Health*. 2021; 6: e2–3.