# Poly-substance use, treatment completion, and contact with the justice system: a multistate analysis of treatments for substance use disorders between 2010-2019 in Chile



<sup>2, iD</sup>, J. Ruiz-Tagle Maturana<sup>1, 3, iD</sup>, M. Mateo Piñones<sup>1, 4, iD</sup>, A. Castillo-Carniglia<sup>5,</sup>

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ANALYSIS OF DRUG POLICIES

<sup>1</sup> Young Researcher, Millennium Nucleus for the evaluation and analysis of Drug Policies <sup>2</sup> Ph.D. student, School of Public Health, Universidad de Chile <sup>3</sup> Ph.D. student, Programa de Doctorado en Políticas Públicas, Universidad Mayor, Santiago, Chile. <sup>4</sup> Ph.D. student, Griffith University, Australia

## Background

Substance use disorders (SUD) often co-occur with criminality, including violence, arrests, and incarceration [1;2;3]. People with polysubstance use (PSU) are considered a high-risk population, as they are associated with mortality, relapse, and contact with the criminal justice system  $(CJS)^{[4;5;6]}$ . Although completing SUD treatment is linked with better outcomes, including preventing contact with CJS, the role of treatment completion in the link between PSU and contact with CJS is unclear<sup>[7;8;9]</sup>. Studies have found mixed evidence regarding the association between PSU and treatment completion rates [10;11;12;13;14]. Thus, it is crucial to determine the role of treatment completion in order to improve outcomes in people with PSU. However, analyzing the role of treatment outcomes in people with PSU is challenging, as there is limited research on this population in Latin America, and high-risk populations have often been overlooked $^{[15;16;17]}$ . The study contributes to a growing literature on the importance of addressing longitudinal dynamics in specific profiles of SUD patients. Studying the link between PSU, treatment completion, and criminality is crucial for evidence-based strategies to address SUD-related issues. Effective interventions and tailored approaches for people with PSU can mitigate societal and individual harms stemming from SUDs and criminal behavior.

#### Objectives

Estimate the mediating effects of completing SUD treatment on the relationship between PSU at admission and contact with CJS among adult patients admitted to SUD treatment programs in Chile during 2010-2019. Specific: (1) To describe the prevalence of PSU, treatment completion, and contact with CJS in the sample, (2) to compare the risk of contact with CJS between people with poly and single-substance use, and (3) to estimate the proportion of the effect of PSU and treatment outcome on the contact with CJS.

## Methods

Design: a retrospective cohort based on the administrative data's record linkage. Data: Chilean SUTs programs and Prosecutor's Office through a deterministic linkage process. We are in the process of an amendment to an existing ethical approval from a study using the same data.

## Variables

**Exposure**: baseline PSU (using more than one main substance among alcohol and illicit drugs at admission to SUD treatment, whether sequential or concurrent); Mediator: SUD treatment outcome (complete vs. dropout or spelled by misconduct); Outcome: contact with CJS (offense that led to a condemnatory sentence).

#### Analytical Plan

The study controlled for various confounding variables related to substance use, demographics, and social factors. Patients were weighted by the inverse probability of PSU based on several predictors. Weights were truncated at the 1st and 99th percentiles [18].

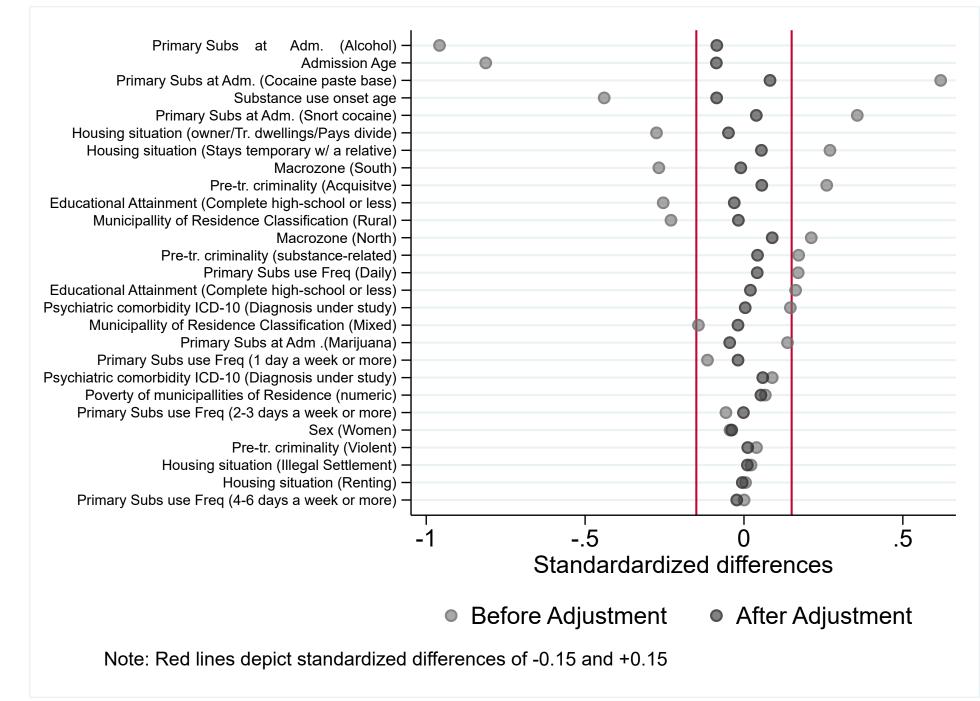


Figure 1: Covariate balance

the illness-death multistate structure to simultaneously estimate transitions between admission and treatment outcome, treatment outcome and contact with CJS, and admission and contact with CJS (without completing treatment).

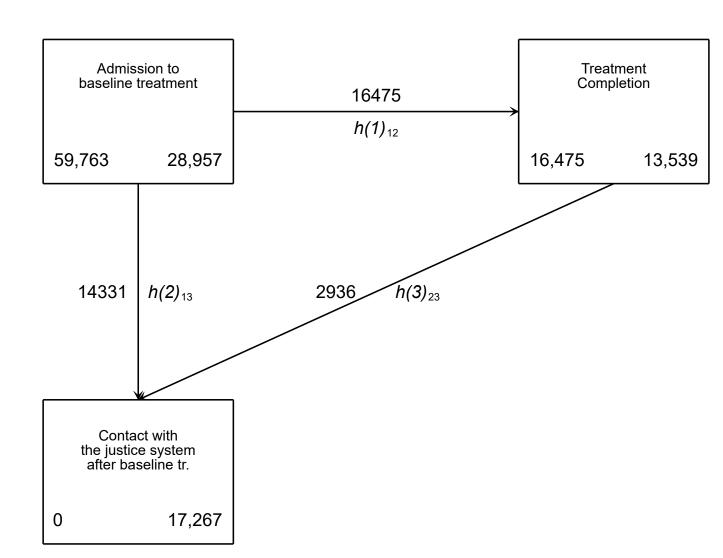


Figure 2: Multistate scheme

We calculated the Aalen-Johansen estimator for transition probabilities at 6 months, 1 and 3 years using the multistate Stata command $^{[19]}$ . Secondary analyses will focus on mediation, estimating the effects of PSU given treatment outcome at selected periods using a standard timeto-first-event approach. Proportions mediated were estimated using the bootstrap method or m-estimation of standard errors on standardized survival curves and restricted mean survival times (RMST) through the <a href="stpm2">stpm2</a> and <a href="stipw">stipw</a> Stata commands $^{[20;21;22;23]}$ . We also plan to run separate analyses

admitted to different treatment settings. available Preliminary markdowns https://fondecytacc.github.io/nDP/an\_ser\_2023\_step\_0.html.

### Preliminary Results

- Before IPWs, patients with PSU at admission (56.43 95%CI: 55.33,57.52) had lower rates (x1,000 person-years) of treatment completion vs. patients with no PSU (107.47 95%CI: 104.41,110.53) 0.53 95%CI: 0.51,0.54. However, patients with PSU at admission (90.74 95%CI: 89.36,92.12) had greater rates (x1,000 person-years) of contact with the justice system vs. patients with no PSU (54.12 95%CI: 52.33,55.92) 1.68 95%CI: 1.62,1.74.
- After IPWs, patients with PSU at admission (67.41 95%CI: 65.87,68.96) still had lower rates (x1,000 person-years) of treatment completion vs. patients with no PSU (87.04) 95%CI: 83.46,90.62) 0.77 95%CI: 0.74,0.81, and patients with PSU at admission (80.26 95%CI: 78.78,81.74) also had greater rates (x1,000 person-years) of contact with the justice system vs. patients with no PSU (72.25 95%CI: 69.01,75.48) 1.11 95%CI: 1.06,1.17.

### Discussion

## References

[2] N. F. Sugie and K. Turney. "Beyond Incarceration: Criminal Justice Contact and Mental Health". In: American Sociological Review 82.4 (ago., 2017), pp. 719–743. ISSN: 0003-3] E. G. Thomas, M. J. Spittal, F. S. Taxman, et al. "Association between contact with mental health and substance use services and reincarceration after release from prison". In. PLOS ONE 17.9 (sept.. 2022), p. e0272870. ISSN: 1932-6203. DOI: 10.1371/journal.pone.0272870. [4] A. N. Hassan and B. Le Foll. "Polydrug use disorders in individuals with opioid use disorder". In: Drug and Alcohol Dependence 198 (may.. 2019), pp. 28–33. ISSN: 03768716. [5] L. Wang, J. E. Min, E. Krebs, et al. "Polydrug use and its association with drug treatment outcomes among primary heroin, methamphetamine, and cocaine users". International Journal of Drug Policy 49 (nov.. 2017), pp. 32–40. ISSN: 09553959. DOI: 10.1016/j.drugpo.2017.07.009. [6] J. A. Ford, K. Ortiz, T. S. Schepis, et al. "Types of criminal legal system exposure and polysubstance use: Prevalence and correlates among U.S. adults in the National Survey on Drug Use and Health, 2015â€"2019". In: Drug and Alcohol Dependence 237 (ago.. 2022), p. 109511. ISSN: 03768716. DOI: 10.1016/j.drugalcdep.2022.109511. [7] W. White. Recovery/remission from substance use disorders: an analysis of reported outcomes in 415 scientific reports, 1868â€"2011. 2012. mar. 14, 2023. URL [8] H. W. Andersson, M. Wenaas, and T. Nordfjærn. "Relapse after inpatient substance use treatment: A prospective cohort study among users of illicit substances". In: Addictive Behaviors 90 (mar., 2019), pp. 222–228. ISSN: 03064603, DOI: 10.1016/j.addbeh.2018.11.008. [9] C. Timko, A. Nash, M. D. Owens, et al. "Systematic Review of Criminal and Legal Involvement After Substance Use and Mental Health Treatment Among Veterans: Building Toward Needed Research". In: Substance Abuse: Research and Treatment 14 (ene., 2020), p. 117822181990128. ISSN: 1178-2218. DOI: 10.1177/1178221819901281. [10] J. Levola, A. Aranko, and T. Pitkänen. "Psychosocial difficulties and treatment retention in inpatient detoxification programmes". In: Nordic Studies on Alcohol and Drugs 38.5 (oct.. 2021), pp. 434–449. ISSN: 1455-0725. DOI: 10.1177/14550725211021263. [11] N. G. Choi and D. M. DiNitto. "Older-Adult Marijuana Users in Substance Use Treatment: Characteristics Associated with Treatment Completion". In: Journal of Psychoactive Drugs 52.3 (may., 2020), pp. 218–227, ISSN: 0279-1072, DOI: 10.1080/02791072,2020.1745966. [12] H. W. Andersson, A. D. F. Lauvsnes, and T. Nordfjærn. "Emerging Adults in Inpatient Substance Use Treatment: A Prospective Cohort Study of Patient Characteristics and Treatment Outcomes.". In: European addiction research 27.3 (2021), pp. 206-215. ISSN: 1421-9891. DOI: 10.1159/000512156. [13] H. W. Andersson, A. Steinsbekk, E. Walderhaug, et al. "Predictors of Dropout From Inpatient Substance Use Treatment: A Prospective Cohort Study". In: Substance Abuse. Research and Treatment 12 (ene., 2018), p. 117822181876055. ISSN: 1178-2218. DOI: 10.1177/1178221818760551. [14] D. Basu, A. Ghosh, S. Sarkar, et al. "Initial treatment dropout in patients with substance use disorders attending a tertiary care de-addiction centre in north India". In: Indian Journal of Medical Research 146.8 (2017), p. 77. ISSN: 0971-5916. DOI: 10.4103/ijmr.IJMR\_1309\_15. [15] J. C. Reyes, C. M. Perez, H. M. Colon, et al. "Prevalence and Patterns of Polydrug Use in Latin America: Analysis of Population-based Surveys in Six Countries". In: Review of European Studies 5.1 (feb.. 2013). ISSN: 1918-7181. DOI: 10.5539/res.v5n1p10. [16] R. Santis B, C. G. Hidalgo C, V. Hayden C, et al. "Consumo de sustancias y conductas de riesgo en consumidores de pasta base de caca'ina no consultantes a servicios de rehabilitación". In: Revista médica de Chile 135.1 (ene.. 2007). ISSN: 0034-9887. DOI: 10.4067/S0034-98872007000100007. [23] M. Hill. "Development and application of methods in parametric survival models: interval censoring, inverse probability weighting and multistate survival models". University of Leicester, 2022, URL: https://doi.org/10.25392/leicester.data.21533514.v1

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- Correspondence to: Andrés González-Santa Cruz, gonzalez.santacruz.andres@gmail.com