

# Assessing the impact of substance use treatment for preventing criminal justice system contact in Chile

M. Mateo Piñones<sup>1, 2, </sup>, A. González-Santa Cruz<sup>1, 3, </sup>, A. Castillo-Carniglia<sup>4, 5, </sup>

<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, Griffith University, Australia  
<sup>4</sup> Director , Millennium Nucleus for the evaluation and analysis of Drug Policies  
<sup>5</sup> Associate Professor, Society & Health Research Center



## Background

Research has shown that reducing SUDs through effective treatment leads to a reduction in criminal activity<sup>[1]</sup>. However, most evidence comes from developed countries, and results from the Latin American context are largely unknown<sup>[2]</sup>. The social, cultural, economic, epidemiological context and substance use treatment (SUT) policy response are different in this region, making the question about SUT effectiveness through locally based data relevant<sup>[3]</sup>.

We analyze Chile as a case study and examine the impact of SUT on the prevention of contact with the criminal justice system (CJS) in the short (1 year), middle (3 years) and long term (5 years). **Hypothesis:** Patients who complete treatment have lower probabilities of being in contact with CJS compared to patients who do not complete, although this effect may decrease as observation time passes.

## Methods

This research relies on a population-based record-linkage retrospective cohort design. We used a deterministic linkage process (using encryption of the Chilean Unique National ID) to merge electronic records of individuals in publicly funded Chilean SUT programs with the Prosecutor’s Office data at the national level between 2010 and 2019. This research is approved by the Griffith University Human Research Ethics Committee (GUHREC) (GU Ref No: 2022/919). We described the cumulative incidence rate and incidence rate ratio (IRR) of contact with the CJS (offenses that ended with a condemnatory sentence and of offenses that ended with imprisonment after baseline treatment outcome), and its variation by baseline treatment outcome: Treatment completion, Late ( $\geq$  3months) & Early dropout (within the first 3 months of treatment). We calculated the association between Baseline treatment outcome and Contact with CJS through Royston-Parmar models while adjusting for several covariates and obtained standardized survival curves and restricted mean survival times (RMST) through the `stpm2` command in Stata<sup>[4]</sup>. Missing data was imputed using multiple imputation with regression trees from `missRanger` R package<sup>[5]</sup>. Secondary analyses included e-values of the strength of confounding needed to take away the associations between treatment outcome and contact with CJS. Codes are available at [bit.ly/40cMATs](https://bit.ly/40cMATs). Covariates are listed below:

- Treatment setting
- Substance use onset age
- Primary substance at admission
- Occupational status
- Number of children (binary)
- Macrozone
- Number of previous offenses (acquisitive)
- Number of previous offenses (other)
- Substance use severity (dependence status) (ICD-10)
- Percentage of poverty of the municipality of residence
- Birth year
- Physical comorbidity
- Sex
- Educational attainment
- Primary substance at admission usage frequency
- Poly-substance use
- Tenure status of households
- Number of previous offenses (violent)
- Number of previous offenses (substance-related)
- Psychiatric comorbidity (ICD-10)
- Urban/rural municipality of residence
- Initial substance
- Cohabitation status
- Admission Age

## Preliminary Results

Of the 109,756(p= 85,048) SENDA records of admissions, 70,863(83%) were eligible to be matched with the Prossecutor’s Office database (discarded ongoing treatments or treatments that ended in referrals). 22,287(31%) had at least an offense that ended with a condemnatory sentence after baseline treatment. Those that had at least an offense that ended with imprisonment were 5,144(7%).

- Compared to those receiving almost no treatment (early dropout), those completing SUT took longer to an offense leading to condemnatory sentence (IRR [Incidence rate ratio]= 2.18 95% CI 2.09,2.27; aHR[adjusted hazard ratio]: 1.74 95%CI 1.66, 1.83) and to an offense leading to imprisonment 2.90 (95% CI 2.64,3.18; aHR= 1.99 95%CI 1.79, 2.22).
- Compared to receiving some treatment (late dropout), those completing SUT took longer (IRR= 1.73 95% CI 1.67,1.80; aHR=1.58 95%CI 1.52, 1.65) to condemnatory sentence and to imprisonment (IRR= 1.93 95% CI 1.77,2.10; aHR=1.65 95%CI 1.51, 1.81).
- However, the difference was lower when we compared those who received some treatment (late dropout) with those with almost no treatment (early dropout) regarding the time to condemnatory sentence (IRR= 1.26 95% CI 1.22,1.30) and imprisonment (IRR= 1.50 95% CI 1.41,1.61). Differences between Early vs Late dropout did not overlap the null in Tables 1 & 2.

Table 1: Offending with Condemnatory Sentence

Time	Complete Tr.	Late Disch.	Early Disch.	Comp. vs Late	Comp. vs Early	Early vs Late
Probs.						
1_yr	90 (89.6,90.4)	84.4 (84.1,84.8)	82.8 (82.3,83.3)	-5.5 (-6,-5)	-7.2 (-7.9,-6.5)	1.7 (1,2.3)
3_yrs	79.4 (78.8,80)	70.9 (70.4,71.3)	69 (68.3,69.7)	-8.6 (-9.3,-7.9)	-10.4 (-11.4,-9.5)	1.9 (1,2.7)
5_yrs	73.4 (72.7,74.2)	63.9 (63.4,64.5)	62.2 (61.4,63.1)	-9.5 (-10.3,-8.7)	-11.2 (-12.3,-10.1)	1.7 (.8,2.7)
RMST						
1_yr	.962 (.959,.965)	.928 (.925,.93)	.916 (.912,.92)	-.034 (-.038,-.031)	-.046 (-.051,-.041)	.012 (.007,.016)
3_yrs	2.622 (2.61,2.635)	2.442 (2.433,2.452)	2.394 (2.379,2.41)	-.18 (-.195,-.164)	-.228 (-.248,-.207)	.048 (.029,.067)
5_yrs	4.172 (4.148,4.197)	3.807 (3.788,3.825)	3.722 (3.692,3.752)	-.366 (-.395,-.336)	-.45 (-.491,-.41)	.085 (.049,.121)

Table 2: Offending with imprisonment

Time	Complete Tr.	Late Disch.	Early Disch.	Comp. vs Late	Comp. vs Early	Early vs Late
Probs.						
1 yr	98.5 (98.3,98.6)	97.3 (97.1,97.4)	96.6 (96.4,96.9)	-1.2 (-1.4,-1.0)	-1.8 (-2.1,-1.5)	0.6 (0.3,0.9)
3 yrs	96.4 (96.1,96.7)	94.3 (94.0,94.5)	93.2 (92.8,93.5)	-2.2 (-2.5,-1.8)	-3.2 (-3.7,-2.8)	1.1 (0.6,1.5)
5 yrs	94.9 (94.6,95.3)	92.3 (92.0,92.6)	91.0 (90.5,91.4)	-2.6 (-3.1,-2.2)	-4.0 (-4.6,-3.3)	1.3 (0.8,1.9)
RMST						
1 yr	0.992 (0.991,0.993)	0.985 (0.984,0.986)	0.981 (0.979,0.982)	-0.007 (-0.009,-0.006)	-0.011 (-0.013,-0.009)	0.004 (0.002,0.006)
3 yrs	2.939 (2.933,2.945)	2.897 (2.893,2.902)	2.876 (2.868,2.883)	-0.042 (-0.049,-0.035)	-0.064 (-0.074,-0.054)	0.022 (0.013,0.031)
5 yrs	4.852 (4.840,4.864)	4.761 (4.751,4.770)	4.715 (4.700,4.730)	-0.091 (-0.106,-0.076)	-0.137 (-0.157,-0.116)	0.046 (0.027,0.065)

- **Condemnatory Sentence:** E-value of at least 2.19 for Early and 2.01 for Late dropout vs. treatment completion.
- **Imprisonment:** E-value of at least 2.36 for Early and 1.99 for Late dropout vs. treatment completion.

The following figure depicts the predicted differences in survival probabilities and RMSTs for committing an offense

that results in a condemnatory sentence and imprisonment.

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## Discussion

The greater the exposure of participants to Chilean treatment programs, the greater the effect on contacting the criminal justice system. Furthermore, the effect is consistent for any offense leading to a condemnatory sentence, including imprisonment, and remains significant after five years post-treatment. These findings are particularly relevant given the integrated approach to substance use treatment in Chile and other Latin American countries, where the effectiveness of such programs is unclear in a literature that typically focuses on specific approaches or substances and in short time periods<sup>[6]</sup>. This research acknowledges the constraints related to administrative data, such as hidden competing events and omitted variables bias (e.g., adolescent treatments). Regarding the generalizability of results, we recognize that the economic and social reality of Latin American countries can vary, even though findings might be more pertinent to these contexts than current evidence from developing countries.

## References

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- **Correspondence to:** Andrés González-Santa Cruz, [gonzalez.santacruz.andres@gmail.com](mailto:gonzalez.santacruz.andres@gmail.com)