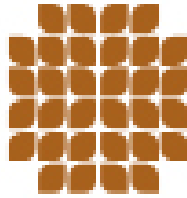# Addiction Treatment Outcomes

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Addiction Recovery Program Treatment Outcomes

Alexander Danvers, PhD

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Sierra Tucson has an innovative and growing program for treating patients suffering from addiction. This program uses holistic treatment practices across several modalities to improve functioning. This brief report provides information on the outcomes of patients who have been treated at the Sierra Tucson Addiction Recovery Program.

Assessments of Patients in the Addiction Recovery Program

Sierra Tucson collects data on patients at several points. The **Comprehensive Psychological Profile (CPP)** is given at entry, to assess pre-treatment symptoms, and at mid-treatment, to assess progress. Data has been collected from **670 patients** in the addiction program from January 2021 to October 2022. Analysis of this data provides information on **acute treatment response** and baseline symptom severity.

Sierra Tucson also offers all former residents (alumni) free access to the Connect 365 program for one year after discharge. This program offers personal points of contact with coaches, who can help residents set goals and talk through their post-discharge care plans. As part of the program, recovery coaches ask patients to report on their treatment outcomes after discharge. Responses to the **Connect 365** survey allow us to provide data on **post-discharge** treatment outcomes. There were **349 residents** in the Addiction Recovery Program who opted to complete the Connect 365 survey after discharge.

Connect 365 data was collected at different points throughout the first year after discharge, based on when recovery coaches were able to reach alumni. In this sample, the post-discharge responses were collected an **average of 4 months after discharge**. The earliest measure was collected at less than 1 month(s) after discharge, and the latest was collected at 20 months after discharge.

Immediate Treatment Response

Paired sample t-tests were performed for 19 key outcomes on the CPP. These statistical tests indicate whether the change from pre-treatment to mid-treatment in the assessment is likely to be reliable. When the *p*-value is < .05, the result is said to be statistically significant, and the change is thought to be large enough to reliably generalize to all people receiving the treatment.

Cravings for Substances

The strength of residents' cravings for different substances of abuse were assessed at pre-treatment and mid-treatment. When conducting analyses on change over time, only people who had some level of craving pre-treatment were included. In the statistics below, we note how many people were included in each analysis. For some substances, like alcohol and marijuana, over 100 individuals were treated for some level of craving. For others, like inhalants or club drugs, only a handful (fewer than 10) individuals were treated.

There were statistically significant reductions in cravings for all substances where at least 20 people were treated. The largest declines occurred in desire for sedatives, stimulants, marijuana, painkillers, and alcohol. These indicate substance cravings that Sierra Tucson is particularly good at treating.

In cases where only a few cases (fewer than 10), statistical significance is harder to achieve. This is because statistical significance is related to whether a change will generalize to anyone who receives treatment, and our statistical model becomes more certain when it has information about a larger group of people. However, in these groups moderate declines in craving for substances were observed.

Results of statistical testing are provided in the table below, and the change is displayed in the plot. Cravings for all substances are measured on a 0 to 10 scale.

Variable	N	Change	significance
Painkillers Craving	30	2.12	**
Stimulants Craving	50	2.80	***
Sedatives Craving	57	3.50	***
Marijuana Craving	140	2.41	***
Cocaine Craving	20	1.43	*
Club Drugs Craving	9	0.89	.
Hallucinogens Craving	22	1.20	*
Heroin Craving	5	1.50	.
Inhalants Craving	6	1.75	.
Methamphetamine Craving	7	1.29	.
Alcohol Craving	148	2.16	***

Note: *** indicates statistical significance at the *p* < .001 level, ** indicates statistical significance at the *p* < .01 level, and * indicates statistical significance at the *p* < .05 level.
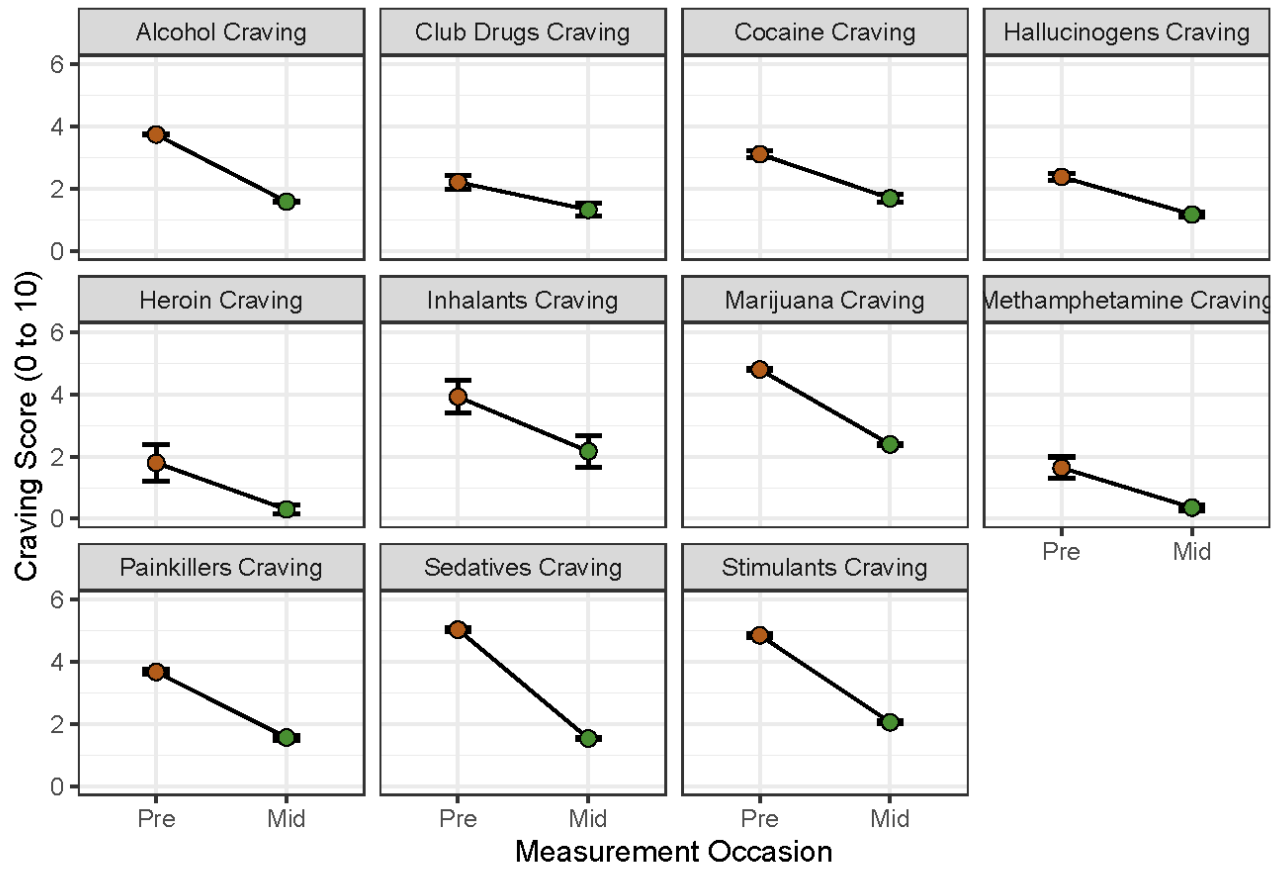
Note: the error bars around the points indicate the upper and lower boundaries of the estimate. Larger bounds indicate more uncertainty.

Comorbid Mental Health Symptoms

Residents at Sierra Tucson who are admitted to our Addiction Recovery Program often also have symptoms of other mental health problems, such as depression and anxiety. The intensive and holistic approach to treatment taken at our facility addresses and often reduces these symptoms. Below are tests of change in these symptoms among all the patients in the Addiction Recovery Program. There were statistically significant declines in all of these symptoms.

- **Overall depression scores**: Pre-treatment average: 47.76 Mid-treatment average: 28, t (390) = 24.9, $p < .001$
- **Overall anxiety scores**: Pre-treatment average: 9.14 Mid-treatment average: 6.65, t (382) = 15.37, $p < .001$
- **Overall PTSD Symptoms**: Pre-treatment average: 46.16 Mid-treatment average: 30.86, t (390) = 18.18, $p < .001$
- The degree to which **pain interferes with daily life**: Pre-treatment average: 12.63 Mid-treatment average: 10.7, t (386) = 5.77, $p < .001$
- Self-reported **sleep disturbances**: Pre-treatment average: 27.37 Mid-treatment average: 21.44, t (386) = 12.91, $p < .001$
- Perceived **stress levels**: Pre-treatment average: 26.68 Mid-treatment average: 17.84, t (386) = 21.16, $p < .001$
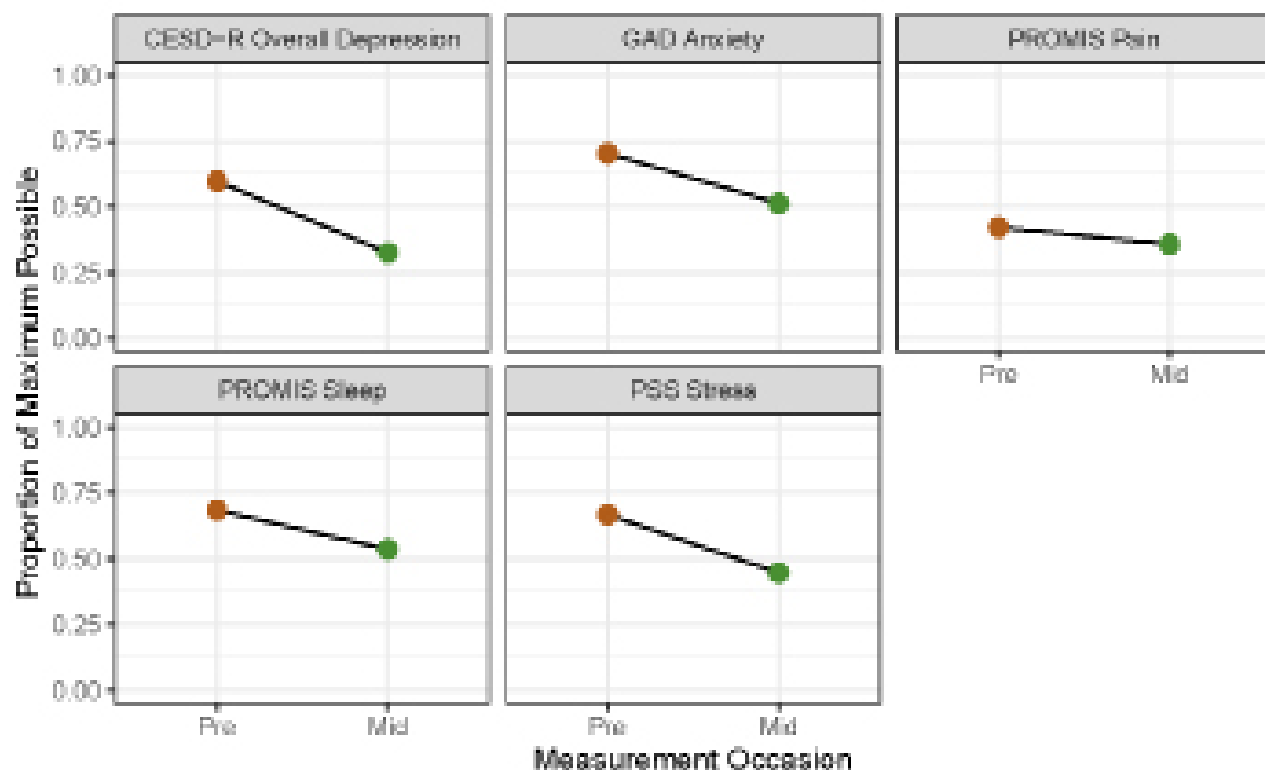

Plots illustrate change over time. Note that values have been rescaled so that all measures can only take values from 0 to 1, regardless of the number of questions. This is referred to as a Percentage of Maximum Possible (POMP) score in the methodological literature, and it is commonly used to make better comparisons across different scales.

Positive Functioning

Results also indicate that patients improved their functioning during the first two weeks of treatment. Statistically significant improvements were seen in:

- **Overall Quality of Life**: Pre-treatment average: 2.35 Mid-treatment average: 3.49, t (386) = -23.61, $p < .001$
- **Physical Quality of Life**: Pre-treatment average: 2.97 Mid-treatment average: 3.74, t (386) = -21.53, $p < .001$
- **Psychological Quality of Life**: Pre-treatment average: 2.24 Mid-treatment average: 3.15, t (386) = -23.64, $p < .001$
- **Social Quality of Life**: Pre-treatment average: 2.62 Mid-treatment average: 3.48, t (386) = -17.45, $p < .001$
- Confidence in **coping with emotions**: Pre-treatment average: 29.6 Mid-treatment average: 44.56, t (386) = -15.43, $p < .001$
- Confidence in **coping with problems**: Pre-treatment average: 49.53 Mid-treatment average: 68.73, t (386) = -15.51, $p < .001$
- Confidence in being able to **rely on social support to cope**: Pre-treatment average: 23.74 Mid-treatment average: 30.54, t (386) = -12.15, $p < .001$
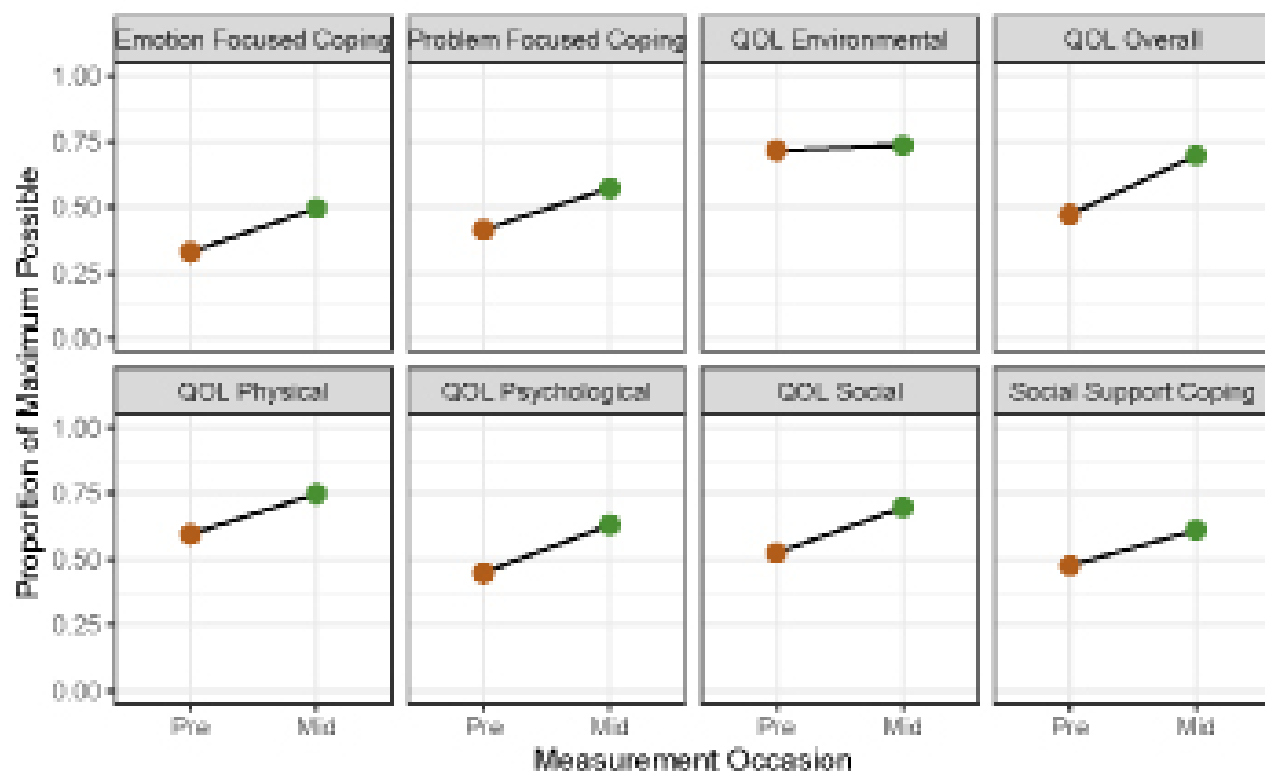
Overall Immediate Response

Results of the statistical tests indicate that patients in the Addiction Recovery Program had reliable improvements in craving and related mental health symptoms over the first two weeks of treatment, such as depression and anxiety. Patients in the Addiction Recovery Program also reported better quality of life and more confidence in their ability to cope with several different aspects of their lives. Overall, there is significant and reliable improvement in psychological functioning among Sierra Tucson addiction patients.

Post-Discharge Follow-Up

Two types of comparisons were made for individuals post-discharge. There were **70 cases** where records from the CPP and Connect 365 post-discharge questionnaire could be matched. This was due to the fact that matching a case required that the individual agreed to participate in the CPP and also signed up for the Connect 365 program. Not all individuals opt in to this program, so there were not always cases that could be matched.

As another point of comparison, scores for all addiction patients at pre-treatment and post-discharge were estimated, even if the records did not match. The advantage of this approach was that more cases at both pre-treatment and post-treatment could be used. For pre-treatment, all CPP cases were considered, even if they didn't match a Connect 365 record. For post-treatment, data collected from before the CPP was implemented could be considered. The disadvantage of this approach is that change within individuals could not be considered—only differences between the groups.

Within Person Psychological Functioning

There were statistically significant increases in patients' overall quality of life, ability to handle stress, and satisfaction with relationships from pre-treatment to post-treatment. All of these changes represented a shift from below-average functioning (i.e., below the median) to above-average functioning (i.e., above the median).

- **Overall Quality of Life**: Pre-treatment average: 2.5 Post-treatment average: 3.77, $t(69) = -9.62$, $p < .001$
- **Ability to Handle Stress**: Pre-treatment average: 2.46 Post-treatment average: 3.71, $t(69) = -9.21$, $p < .001$
- **Satisfaction with Relationships**: Pre-treatment average: 2.68 Post-treatment average: 3.64, $t(69) = -8.09$, $p < .001$
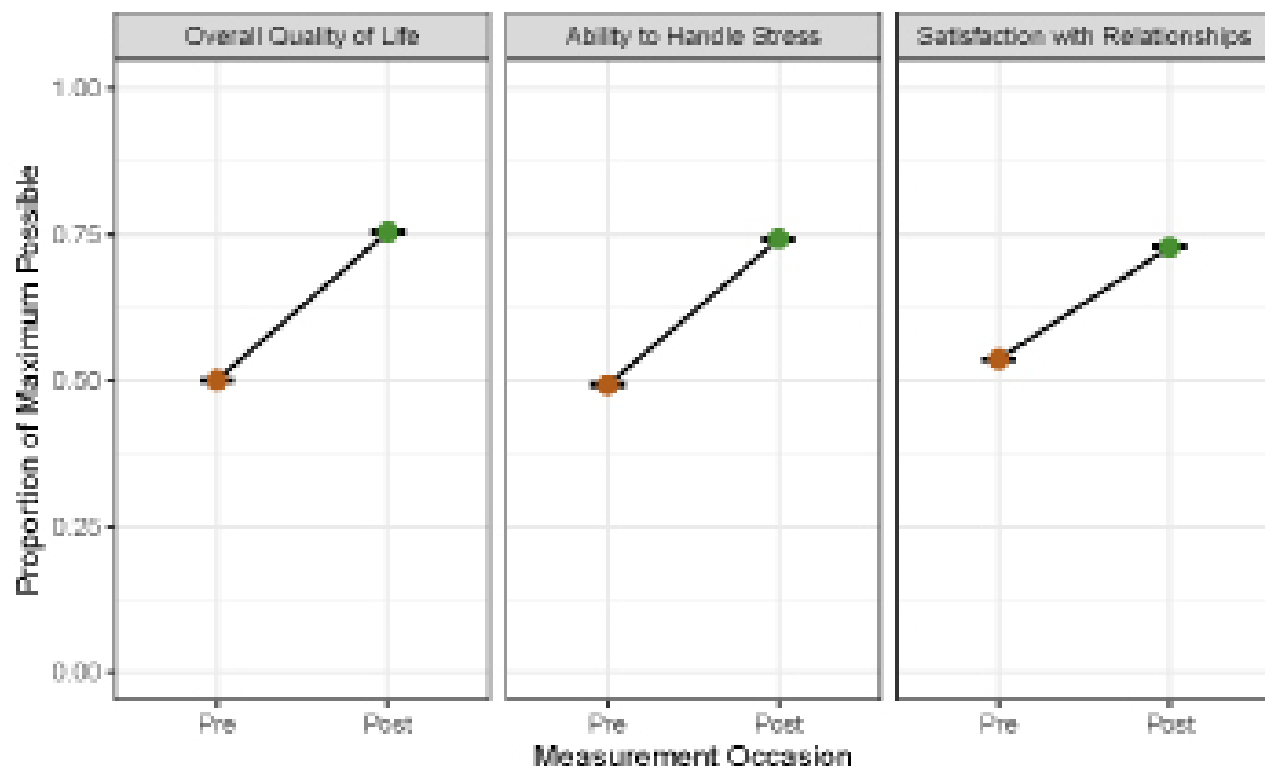
Within Person Objective Outcome Measures

There were statistically significant improvements in several objective measures of functioning. Of particular importance for patients in the Addiction Recovery program, patients reported dropped their substance use from around 19 days in the last month pre-treatment to only around 3 days post-treatment. There were also significant declines in the number of days requiring treatment at a hospital or ER, the proportion of patients compliant with their treatment recommendations, and the number of days individuals attended voluntary support groups.

From pre-treatment to post-treatment, the following changes were recorded:

- **Number of Days Using Substances of Abuse (out of 30)**: Pre-treatment average: 19.16 Post-treatment average: 2.9, $t(69) = 11.01$, $p < .001$
- **Number of Days Needing Treatment at a Hospital or ER (out of 30)**: Pre-treatment average: 2.54 Post-treatment average: 0.9, $t(69) = 2.43$, $p = .018$
- **Proportion of Patients Compliant with Treatment Recommendations**: Pre-treatment average: 0.66 Post-treatment average: 0.88, $t(69) = -3.52$, $p < .001$
- **Number of Days Attending Voluntary Support Groups (out of 30)**: Pre-treatment average: 4.36 Post-treatment average: 9.6, $t(69) = -3.79$, $p < .001$
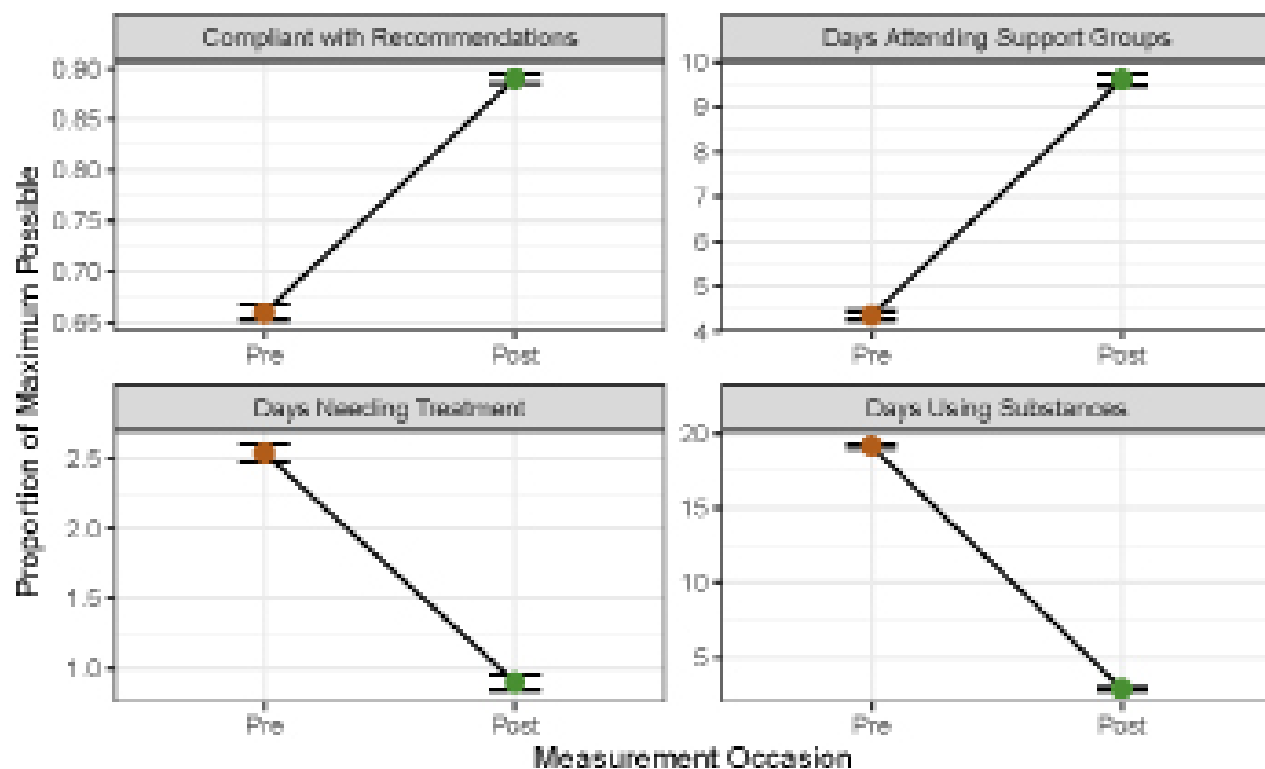
Group Level Psychological Functioning

There were statistically significant differences in all measures of psychological functioning, with people reporting better functioning after discharge.

- **Overall Quality of Life**: Pre-treatment average: 2.35 Post-treatment average: 4.08, t (1363.6) = -36.15, $p < .001$
- **Ability to Handle Stress**: Pre-treatment average: 2.06 Post-treatment average: 3.97, t (1365.3) = -39.54, $p < .001$
- **Satisfaction with Relationships**: Pre-treatment average: 2.62 Post-treatment average: 3.98, t (1372.4) = -26.65, $p < .001$
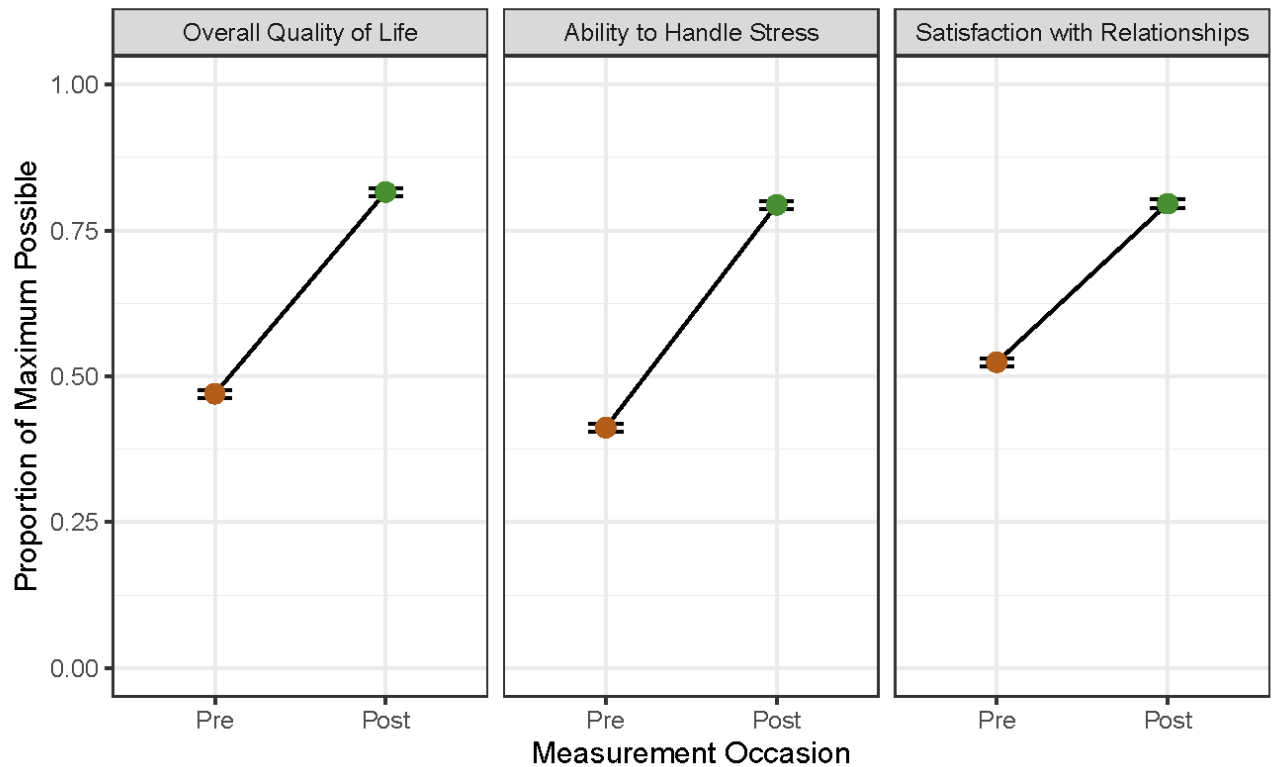
Group Level Objective Outcome Measures

The group level analyses allowed us to include many more individuals in our sample, since we did not restrict ourselves to those whose records could be matched. In this larger sample, we observed that patients reported using substances an average of 10 days a month before entering treatment. After treatment, patients reported using substances an average of 1 day a month. There were also statistically significant increases in the proportion of individuals compliant with treatment recommendations, the number of days attending support groups, and decreases in the number of days needing treatment in a hospital or ER.

There were statistically significant differences in all objective measures of functioning. Results are provided below:

- **Number of Days Using Substances of Abuse (out of 30)**: Pre-treatment average: 10.37 Post-treatment average: 0.85, $t(834.6) = 26.79$, $p < .001$
- **Number of Days Needing Treatment at a Hospital or ER (out of 30)**: Pre-treatment average: 3.49 Post-treatment average: 0.25, $t(737.3) = 12.38$, $p < .001$
- **Proportion of Patients Compliant with Treatment Recommendations**: Pre-treatment average: 0.69 Post-treatment average: 0.92, $t(1077.3) = -10.88$, $p < .001$
- **Number of Days Attending Voluntary Support Groups (out of 30)**: Pre-treatment average: 2.94 Post-treatment average: 11.8, $t(1188.7) = -19.12$, $p < .001$
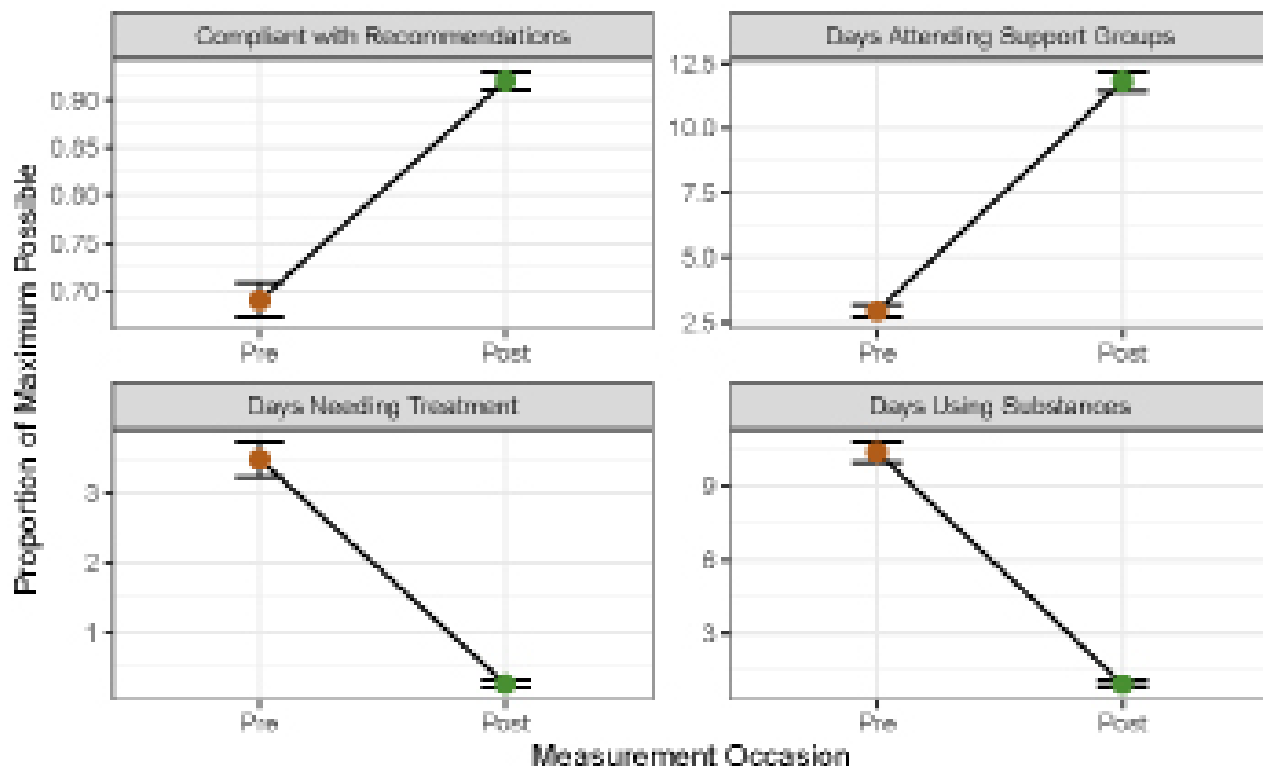
Conclusions

The different analyses of data from addiction patients at Sierra Tucson all point to the same conclusions: the Sierra Tucson Addiction Recovery Program improves outcomes. Specifically:

- There are significant decreases in craving for most substances of abuse during the first two weeks of treatment.
- After discharging from treatment, residents report using substances on substantially fewer days: among the paired cases, days of use fell from 19 to 3 days a month. Among all measured people, days of use fell from 10 to 1 day a month.
- There are significant reductions in comorbid mental health symptoms over the first two weeks of treatment.
- Quality of life improve significantly after the first two weeks of treatment, and it remains improved after discharge.
- There were improvements in several objective indicators of functioning, such as needing less medical treatment, being more compliant with treatment recommendations, and attending more voluntary support groups.
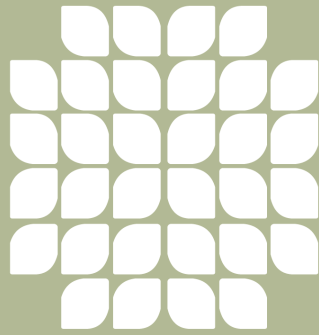
Methodological Notes

Immediate Treatment Response

As part of the Comprehensive Psychological Profile (CPP) given at pre-treatment and mid-treatment, the following measures were used:

1. PROMIS Pain Interference (PIQ 6b)
2. Center for Disease Epidemiological Depression Scale-Revised (CESD-R)
3. Anxiety (GAD-Q-IV)
4. The PROMIS Sleep Questionnaire
5. Perceived Stress Scale (PSS)
6. Post-Traumatic Stress Disorder Checklist (PCL-5)
7. World Health Organization, Brief Quality of Life survey (WHOQOL-BREF)
8. Coping Self-Efficacy survey (CSE)

Post-Discharge Treatment Response

At both pre-treatment and post-discharge, several questions from the Substance Abuse and Mental Health Services Administration (SAMHSA) National Outcome Measures (NOM) scale were assessed. These questions are the source of data for the pre-treatment to post-discharge comparisons.

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