# SUD Outcomes Network
# 2021 Report

**Produced by the Research Institute at Cumberland Heights Foundation**

sudoutcomesnetwork.org

# What is The SUD Outcomes Network?

The Substance Use Disorder (SUD) Outcomes Network is a shared cloud-based data repository. Launched on January 1st, 2020, the network was constructed to support longitudinal collection of patient outcomes post-treatment. Six behavioral health providers contributed in founding the SUD Outcomes Network (**Cumberland Heights, Fellowship Hall, High Watch, Livengrin, Pavillon, and Tully Hill**). As providers, we believe it is our responsibility to monitor and measure the effectiveness of our own programs. The technology system and preliminary results highlighted here are a product of that commitment. We recognize that in the case of data, a familiar African Proverb reads true, 'If you want to go quickly, go alone. If you want to go far, go together.'

The overall goal of the Network remains focused on the development and maintenance of a shared cloud-based outcomes repository. The repository supports our collective ability to:

*1. Improve our Practices*

*2. Better Inform our Patients*

*3. Communicate with External Stakeholders*

Cumberland Heights

Our collective investment into the SUD Outcomes Network has yielded significant output. Across the first twenty-four months, six organizations have joined the network, begun to share de-identified data across our healthcare systems, and have disseminated two annual reports directly to the public. This report represents the second installment in that communication. Our teams are excited to continue sharing preliminary results with our patients, staff, and community stakeholders.

Respectfully,

*Nick Hayes*

Nick Hayes, PhD
Chief Science Officer, Cumberland Heights Foundation

# Why We Are Investing in Research and Technology?

The field of SUD treatment has many immense challenges. None as fundamentally problematic than that of Measurement.[1] For decades, the practice of SUD treatment has been mired in issues of effectiveness, access, logistics, and cost. These issues have significantly stunted the growth of our practice. The connection between effective measurement and quality is significant. More specifically, ***when any treatment science is unable to communicate their outcomes how then can that practice advocate for increased quality, equitable access, and amplified support?***

Today, both technology accelerants and data science applications have begun to yield unique opportunities for SUD providers. First, our ability to collect data has never been easier. The rapid adoption of smart devices has provided the logistical framework for rapid follow up and measurement of patient well-being. For example, checking in via text message survey or monitoring heart rate variability (HRV) via biometric wearable device (i.e., smartwatch). Second, the increased use of online resources has significantly increased the ease of wrangling data for use in healthcare contexts (e.g., business intelligence, data science, or research). Last, the maturation of data science across several domains of science (e.g., psychology, medicine, engineering, etc.) has led to an explosion of resources and applications that are designed to store, clean, model, and disseminate data rapidly.



**SUD Outcomes Network**

- Cloud-based Data Repository
- Real-Time Aggregation and Reporting
- Smart Device Oriented

**These developments have significantly improved our collective ability to address issues of effectiveness, access, logistics, and cost—giving our network the opportunity to leverage these tools in support of practice improvement.**

# How We Measure Change?

Measurement in the psychological sciences has long been associated with minimal standards. For example, the only current industry [Substance Use Disorder (SUD) treatment] standard for measurement is diagnosis.[2] There are simply no other universally applied standards for measurement. Due to that fact, measurement in behavioral health treatment contexts remains one of the most critical issues of our time. Fortunately, emerging evidenced-based practices, technology accelerants, and novel data collection techniques are significantly increasing our ability to monitor patient change states.[3]

The fundamental concentration of our data collection effort centers entirely on three simple domains of measurement. These measurement domains increase our ability to descriptively identify patients, monitor treatment dosage, and observe post-treatment outcomes. The utility of these data are immense when collected consistently across multiple providers.

**The initial focus of the SUD Outcomes Network was balanced across three domains of measurement:**

**1** **Who are our patients?**   **2** **What treatments did they receive?**   **3** **What outcomes did we observe?**

| PATIENT | TREATMENT | OUTCOME |
|---|---|---|
| Patient Descriptives | Treatment Dosage | Outcomes |
| GENDER | LEVEL OF CARE | MEETING ATTENDANCE |
| ETHNICITY | LENGTH OF STAY | USE DAYS |
| AGE | | ER VISITS |
| DIAGNOSES | | INTERACTIONS W/ |
| USE HISTORY | | LAW ENFORCEMENT |
| | | STANDARDIZED ASSESSMENT |

The SUD Outcomes Network, with support from a technology partner, opted to design a simple measurement program that could support the collection of these three domains of measurement. The below figure illustrates the time series used to collect data from discharged patients.

DISCHARGE

1 MONTH   2 MONTHS   3 MONTHS   6 MONTHS   9 MONTHS   12 MONTHS

Post-Discharge Follow Up
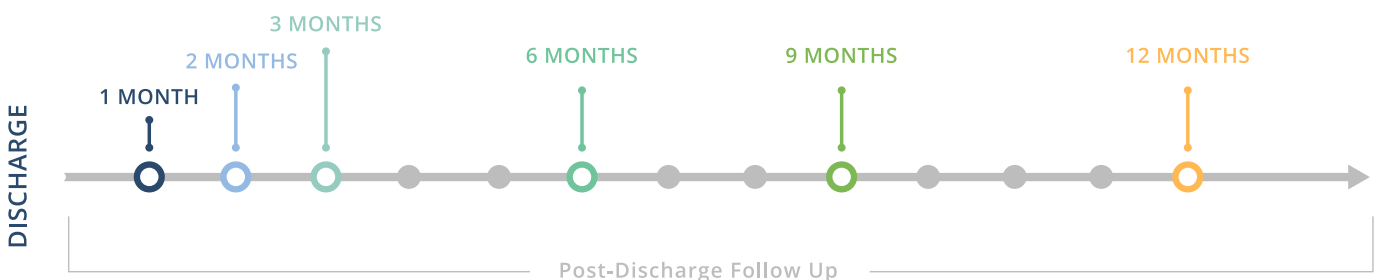
# What We Measure?

The below tables illustrate our team's commitment to the development of a parsimonious data collection application. These domains of measurement were constructed through extensive literature review of historical measurement indices leveraged throughout SUD treatment contexts.[4, 5 & 6]

## Patient Demographics and Treatment Dosage

| DEMOGRAPHICS | TREATMENT DOSAGE |
|---|---|
| Q1 (Biological Sex) | Q1 (Days in Detox) |
| | Q2 (Days in Residential) |
| Q2 (Ethnicity) | Q3 (Days in Partial Hospitalization) |
| | Q4 (Days in Intensive Outpatient) |
| Q3 (Age) | Q5 (Days in Outpatient) |
| | Q6 (Discharge Type) |
| Q4 (Organization) | Q7 (Primary SUD Diagnostic Category) |
| | Q8 (Co-Occurring Diagnostic Category) |

## Post-Discharge Outcomes Survey

| | |
|---|---|
| Q1 (Service Utilization) | Are you currently using any of the following services? |
| Q2 (Meeting Attendance) | Over the last 30 days, how many recovery support meetings have you attended? |
| Q3 (Substance Use) | Over the last 30 days, how many total days have you used alcohol and/or drugs? |
| Q4 (Use of Medications (MAT)) | Which of the following medications are you currently taking in support of your recovery? |
| Q5 (Medical Contact) | Over the last 30 days, how many days did you visit the hospital or ER as related to your recovery? |
| Q6 (Legal Contact) | Over the last 30 days, how many incidents have you had with law enforcement? |
| Q7 (Employment) | What is your current employment status? |
| Q8 (Quality of Life) | How would you rate your quality of life? (01/01/21) |
| Q9 (Nicotine Use) | How frequently are you using nicotine (smoking, vaping, or dipping)? (01/01/21) |
| Q10 (Recovery) | What is your recovery date? |

Pavillon

# Participating Organizations

Cumberland Heights has been serving individuals and families affected by substance use disorders for 55 years. We are committed to helping patients access recovery through the delivery of evidenced based practices, full continuum treatment options, and comprehensive continuing care support.

www.cumberlandheights.org

Fellowship Hall is committed to exceptional, compassionate care, helping individuals and their families find hope through treatment and recovery from substance use disorders.

www.fellowshiphall.com

Founded by Bill Wilson and Marty Mann in the Northeast corner of Connecticut, High Watch is the world's first addiction treatment center founded on the principles of Twelve Steps.

www.highwatchrecovery.org

Livengrin is the Philadelphia region's largest addiction treatment center and drug rehab facilty.

www.livengrin.org

Discover whole-person addiction treatment with Pavillon's six-week residential programs and continuing care to live free of addiction.

www.pavillon.org

Tully Hill provides high quality alcohol and other drug addiction treatment and care to persons and their families throughout New York State and the northeastern U.S.

www.tullyhill.com

# Our Patients

The following highlights descriptive information collected from the SUD Outcomes Network (01/01/20 – 12/31/20). These data provide aggregate overview of the patients that received treatment at participating organizations.

**SAMPLE** *n* = 6,736

**MALE:** 61%

**FEMALE:** 26%

**AGE** (Range = 18-79)

**M:** 41.33     **SD:** 13.5

## ETHNICITY

| | |
|---|---|
| White | 64% |
| Black | 3% |
| Other | 2% |
| Hispanic | 1% |

| | |
|---|---|
| Native Peoples | <1% |
| Asian | <1% |
| Multi-Ethnic | <1% |
| Pacific Islander | <1% |

## SUD DIAGNOSIS

| | |
|---|---|
| Alcohol | 64% |
| Opioid | 15% |
| Stimulant | 6% |
| Sedative-Hypnotic-Anxiolytic | 2% |

| | |
|---|---|
| Cannabis | 2% |
| Other | 1% |
| Hallucinogen | <1% |
| Inhalant | <1% |

## CO-OCCURRING DIAGNOSIS

| | |
|---|---|
| Depression Disorder | 12% |
| Anxiety Disorder | 11% |

| | |
|---|---|
| Trauma Disorder | 5% |

Pavillon

# Our Treatments

Measuring treatment dosage is fundamentally critical in exploring treatment outcome. Congruent with industry standards, our healthcare organizations measure treatment by duration in Levels of Care.[7] These data provide aggregate overview of the treatments received across participating organizations. On average (2020-2021), patients spent **33.64 days** in our health systems.

*Average Length of Stay by Level of Care (across participating organizations)*

| ⏰ LENGTH OF STAY | Detox | Residential | Partial Hospitalization | Intensive Outpatient | Outpatient | Total |
|---|---|---|---|---|---|---|
| 📄 AVERAGE DAYS | 4.69 | 27 | 26.62 | 40.92 | 52.98 | 33.64 |

*Length of Stay by Organization*

Tully Hill
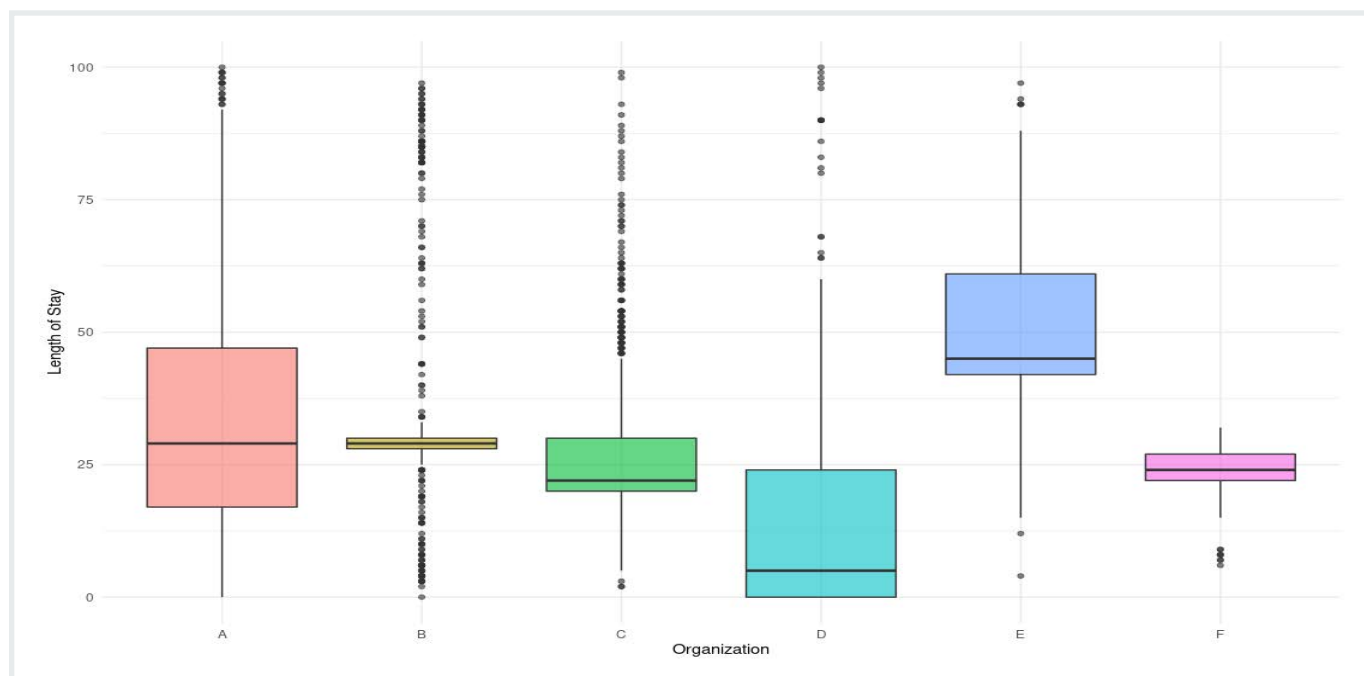
## *Aggregate Discharge Type (across participating organizations)*

| DISCHARGE TYPE | Regular | Against Medical Advice | Behavioral | Administrative | Medical | Missing |
|---|---|---|---|---|---|---|
| AGGREGATE PERCENTAGE | 72% | 11% | 4% | 2% | 2% | 9% |

## *Discharge Type by Organization*
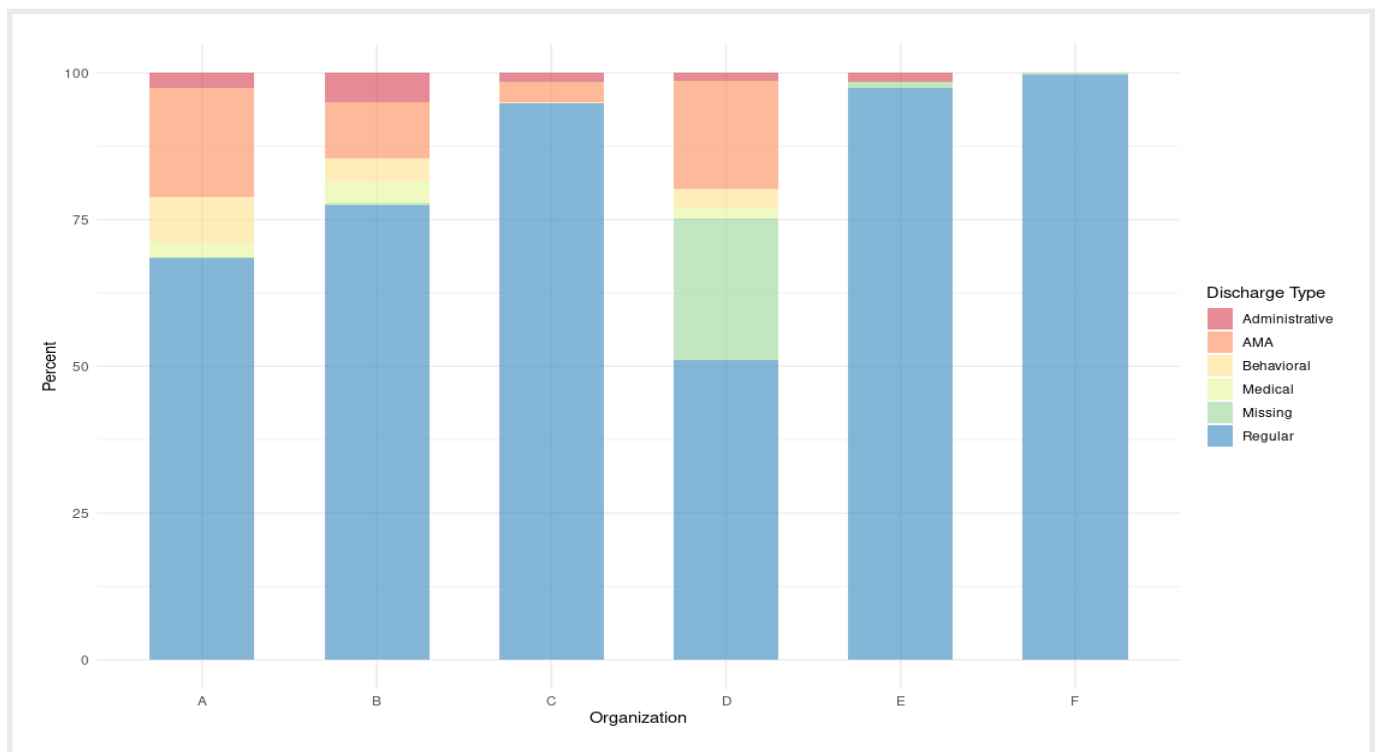
Fellowship Hall

# Results

The following preliminary findings highlight treatment efficacy as observed across the first two years of our collaborative (01/01/2020 – 12/31/2021) (n = 6,736). Using foundational methods leveraged throughout Exploratory Data Analysis and Inferential Statistics these variables were examined for significant association. The data were analyzed completely de-identified from Protected Health Information and Organizational Identifiers. All analyses were completed in R and RStudio Version 1.2.5033 [8]. The following outcomes were observed in these data:

**Increased Length of Stay** was associated with **decreased Using Days, increased Meeting Attendance, decreased Incidents with Law Enforcement,** and **decreased Emergent Medical Events.**

**Successfully Completing Treatment** was associated with **increased Meeting Attendance, decreased Using Days, decreased Incidents with Law Enforcement,** and **decreased Emergent Medical Events** (as compared to all other discharge types).

**Significant group mean differences** (meeting attendance) were observed in patients who successfully completed treatment (as compared to all other discharge types).
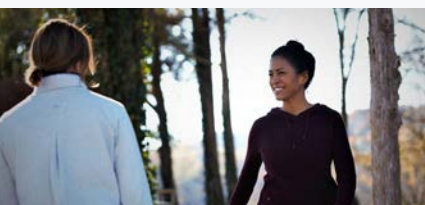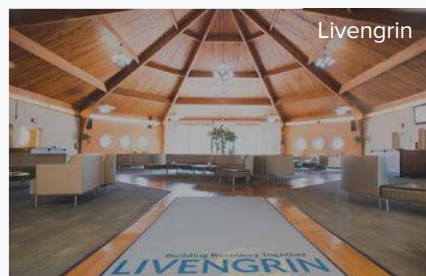
**Significant linear relationship** was observed between Length of Stay and Meeting Attendance

**Significant linear relationship** was observed between Length of Stay and Use Days.

The network maintains a **32% successful follow-up rate.**




Tully Hill


Livengrin



**These data and preliminary findings represent the positive change that our treatments can have on patient outcomes.**

Tully Hill

# Follow-up

Patients, family members, regulatory bodies, and third-party payors have long called for transparency in outcome reporting by SUD providers. Below our organizations highlight the follow up rates for the sample identified throughout this report. Importantly, the SUD Outcomes Network is entirely dynamic (i.e., automated). We are proud of these data and look forward to sharing the insights generated by our collaborative process.

### *Follow Up Proportions*

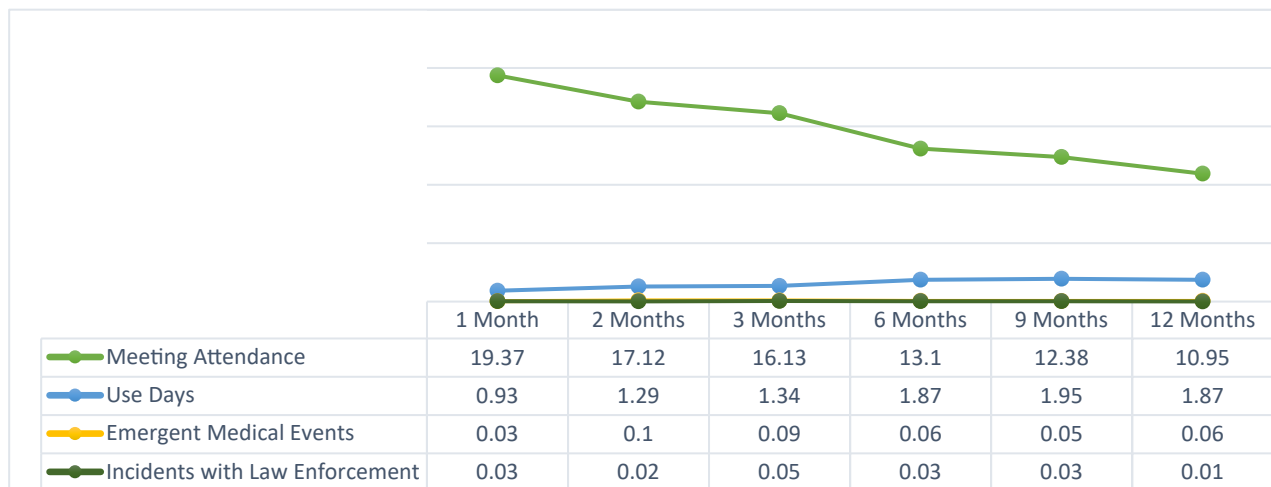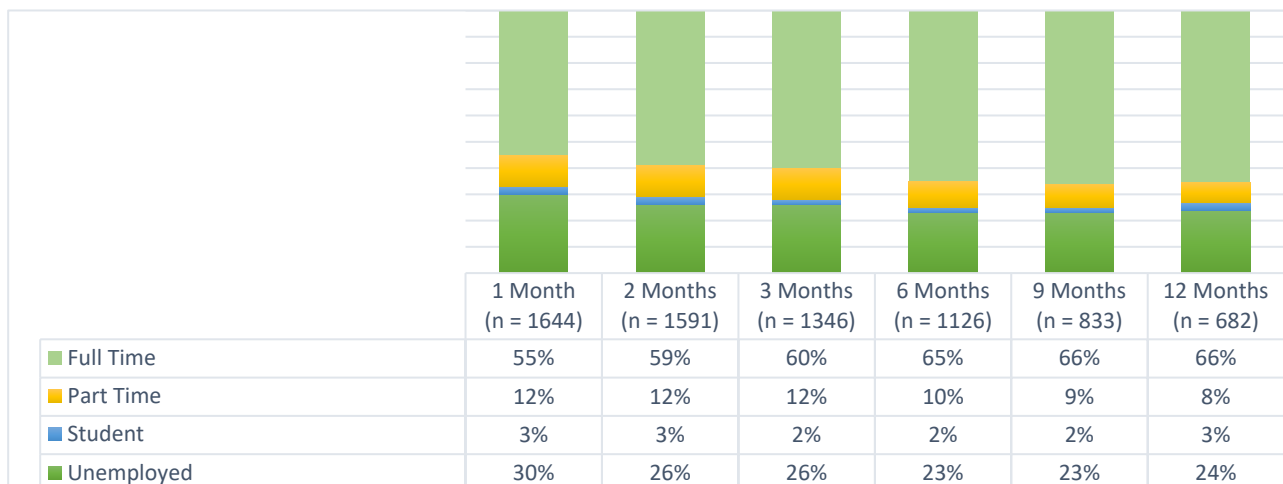| TIME | Discharge | 1 Month | 2 Months | 3 Months | 6 Months | 9 Months | 12 Months | TOTAL |
|---|---|---|---|---|---|---|---|---|
| ELIGIBLE (participants) | n = 6,736 | n = 6,697 | n = 6,678 | n = 6,580 | n = 5,951 | n = 5,053 | n = 4,088 | n = 41,783 |
| FOLLOW UP (respondents) | n = 5,788 | n = 1,749 | n = 1,706 | n = 1,447 | n = 1,197 | n = 893 | n = 728 | n = 13,508 |
| COMPLETION RATE | 86% | 26% | 26% | 22% | 20% | 18% | 18% | 32% |

# Outcomes

The current iteration of our network includes the following eight indicators of outcome: Meeting Attendance, Use Days, Incidents with Law Enforcement, Emergent Medical Events, Employment Status, Use of Medication, Quality of Life, and Nicotine Use. These measures increase our ability to better understand how patients are responding to our treatments post discharge. The following visualizations represent the observed mean change in these outcomes across time.

### Meeting Attendance, Use Days, Emergent Medical Events, and Incidents with Law Enforcement

|  | 1 Month | 2 Months | 3 Months | 6 Months | 9 Months | 12 Months |
|---|---|---|---|---|---|---|
| Meeting Attendance | 19.37 | 17.12 | 16.13 | 13.1 | 12.38 | 10.95 |
| Use Days | 0.93 | 1.29 | 1.34 | 1.87 | 1.95 | 1.87 |
| Emergent Medical Events | 0.03 | 0.1 | 0.09 | 0.06 | 0.05 | 0.06 |
| Incidents with Law Enforcement | 0.03 | 0.02 | 0.05 | 0.03 | 0.03 | 0.01 |

Note: These frequencies represent total number of days participants indicated these events to have occured (across each measurement period).
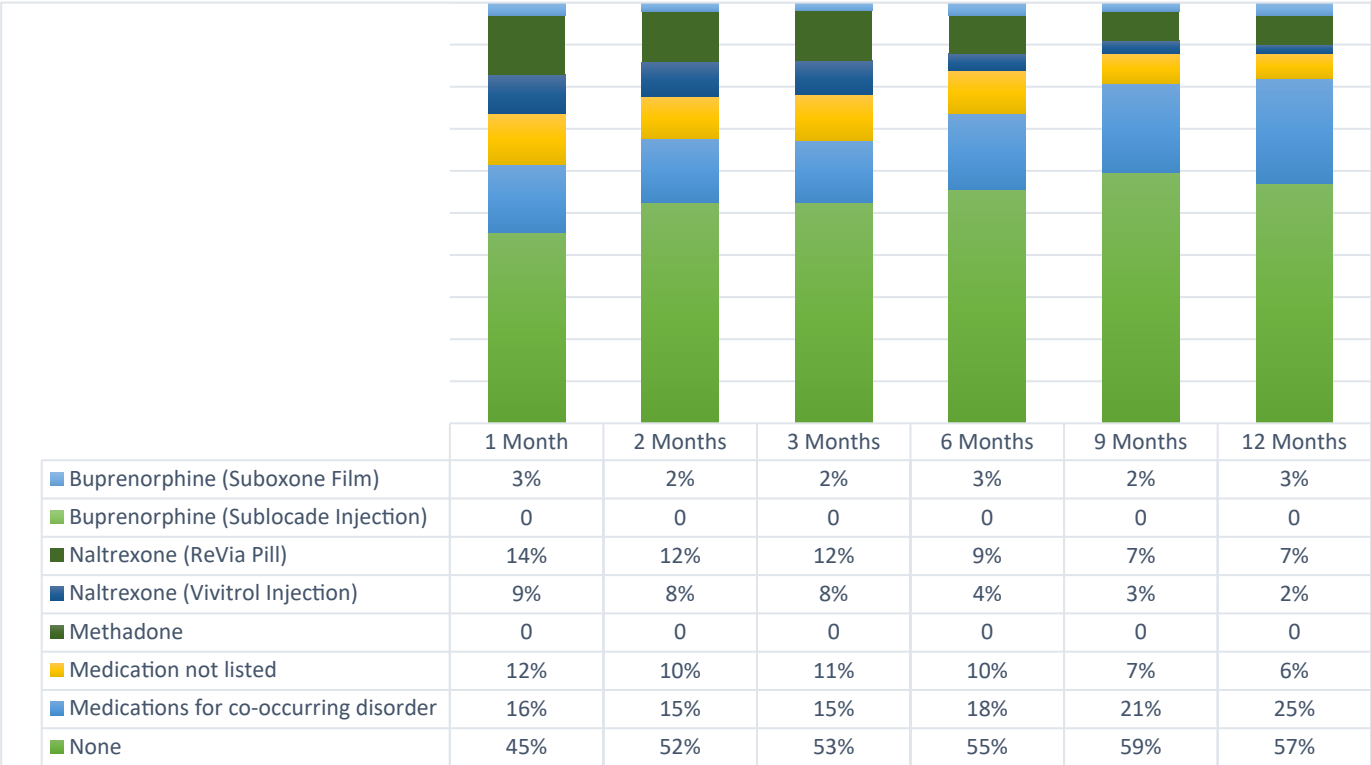
### Employment Status

|  | 1 Month (n = 1644) | 2 Months (n = 1591) | 3 Months (n = 1346) | 6 Months (n = 1126) | 9 Months (n = 833) | 12 Months (n = 682) |
|---|---|---|---|---|---|---|
| Full Time | 55% | 59% | 60% | 65% | 66% | 66% |
| Part Time | 12% | 12% | 12% | 10% | 9% | 8% |
| Student | 3% | 3% | 2% | 2% | 2% | 3% |
| Unemployed | 30% | 26% | 26% | 23% | 23% | 24% |

Note: These frequencies represent employment status indicated by participants (across each measurement period).

Pavillon

## Use of Medications

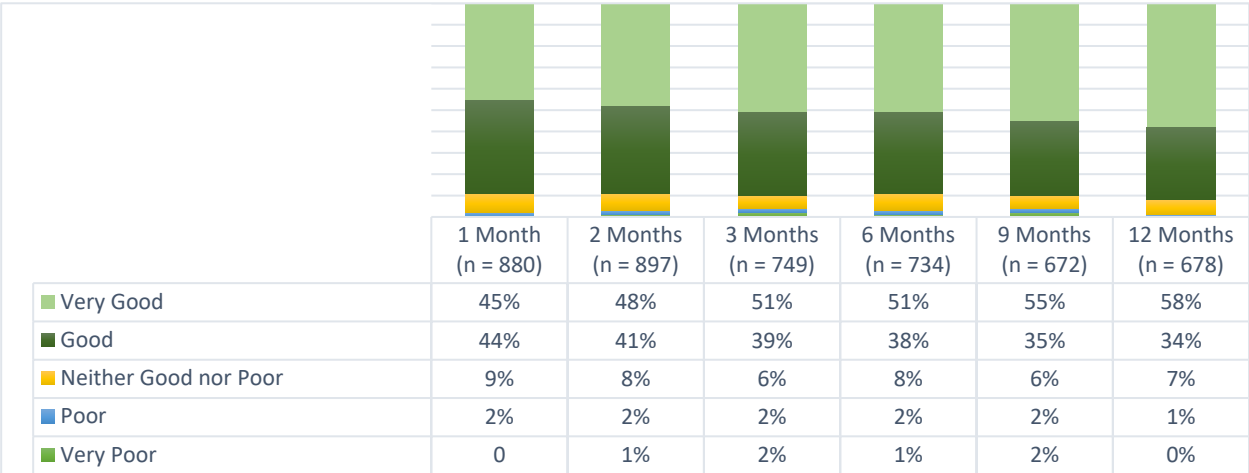| | 1 Month | 2 Months | 3 Months | 6 Months | 9 Months | 12 Months |
|---|---|---|---|---|---|---|
| Buprenorphine (Suboxone Film) | 3% | 2% | 2% | 3% | 2% | 3% |
| Buprenorphine (Sublocade Injection) | 0 | 0 | 0 | 0 | 0 | 0 |
| Naltrexone (ReVia Pill) | 14% | 12% | 12% | 9% | 7% | 7% |
| Naltrexone (Vivitrol Injection) | 9% | 8% | 8% | 4% | 3% | 2% |
| Methadone | 0 | 0 | 0 | 0 | 0 | 0 |
| Medication not listed | 12% | 10% | 11% | 10% | 7% | 6% |
| Medications for co-occurring disorder | 16% | 15% | 15% | 18% | 21% | 25% |
| None | 45% | 52% | 53% | 55% | 59% | 57% |

*Note: These frequencies represent medication use indicated by participants (across each measurement period).*
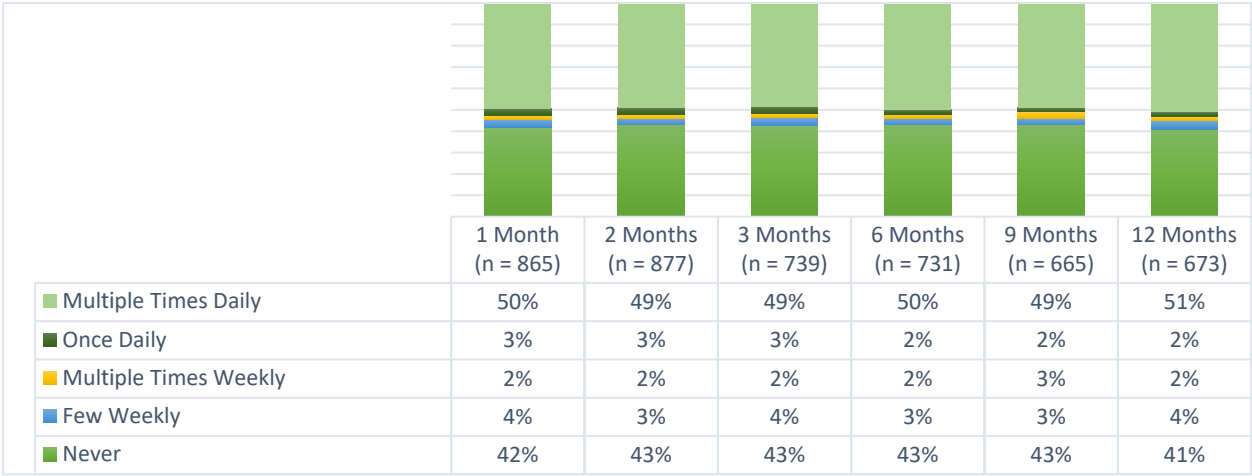
## Quality of Life

| | 1 Month (n = 880) | 2 Months (n = 897) | 3 Months (n = 749) | 6 Months (n = 734) | 9 Months (n = 672) | 12 Months (n = 678) |
|---|---|---|---|---|---|---|
| Very Good | 45% | 48% | 51% | 51% | 55% | 58% |
| Good | 44% | 41% | 39% | 38% | 35% | 34% |
| Neither Good nor Poor | 9% | 8% | 6% | 8% | 6% | 7% |
| Poor | 2% | 2% | 2% | 2% | 2% | 1% |
| Very Poor | 0 | 1% | 2% | 1% | 2% | 0% |

*Note: These frequencies represent quality of life indicated by participants (across each measurement period).*

Livengrin

### Nicotine Use

| | 1 Month (n = 865) | 2 Months (n = 877) | 3 Months (n = 739) | 6 Months (n = 731) | 9 Months (n = 665) | 12 Months (n = 673) |
|---|---|---|---|---|---|---|
| Multiple Times Daily | 50% | 49% | 49% | 50% | 49% | 51% |
| Once Daily | 3% | 3% | 3% | 2% | 2% | 2% |
| Multiple Times Weekly | 2% | 2% | 2% | 2% | 3% | 2% |
| Few Weekly | 4% | 3% | 4% | 3% | 3% | 4% |
| Never | 42% | 43% | 43% | 43% | 43% | 41% |

Note: These frequencies represent nicotine use indicated by participants (across each measurement period).




Tully Hill




Fellowship Hall

**"These measures increase our ability to better understand how patients are responding to our treatments post discharge."**

# Significant Findings

The observed association between treatment dosage and post discharge outcomes is critical in assisting our efforts to model treatment effectiveness. For example, some treatments might be more effective across distinct patient groups. Exploring how different courses of treatment impact different patient groups significantly increases our ability to improve our practices and best assist each patient. Using foundational methods in inferential statistics (i.e., ANOVA, and linear regression) these variables were examined for significant associations.

*Meeting Attendance and Completion Status*

Do patients who successfully complete treatment engage in more recovery activity (as compared to those whom to not complete)? The below visualization highlights significant group mean differences for Meeting Attendance across Completion Status outcome. These data demonstrate that patients who successfully complete treatment were observed to attend more meetings over time.
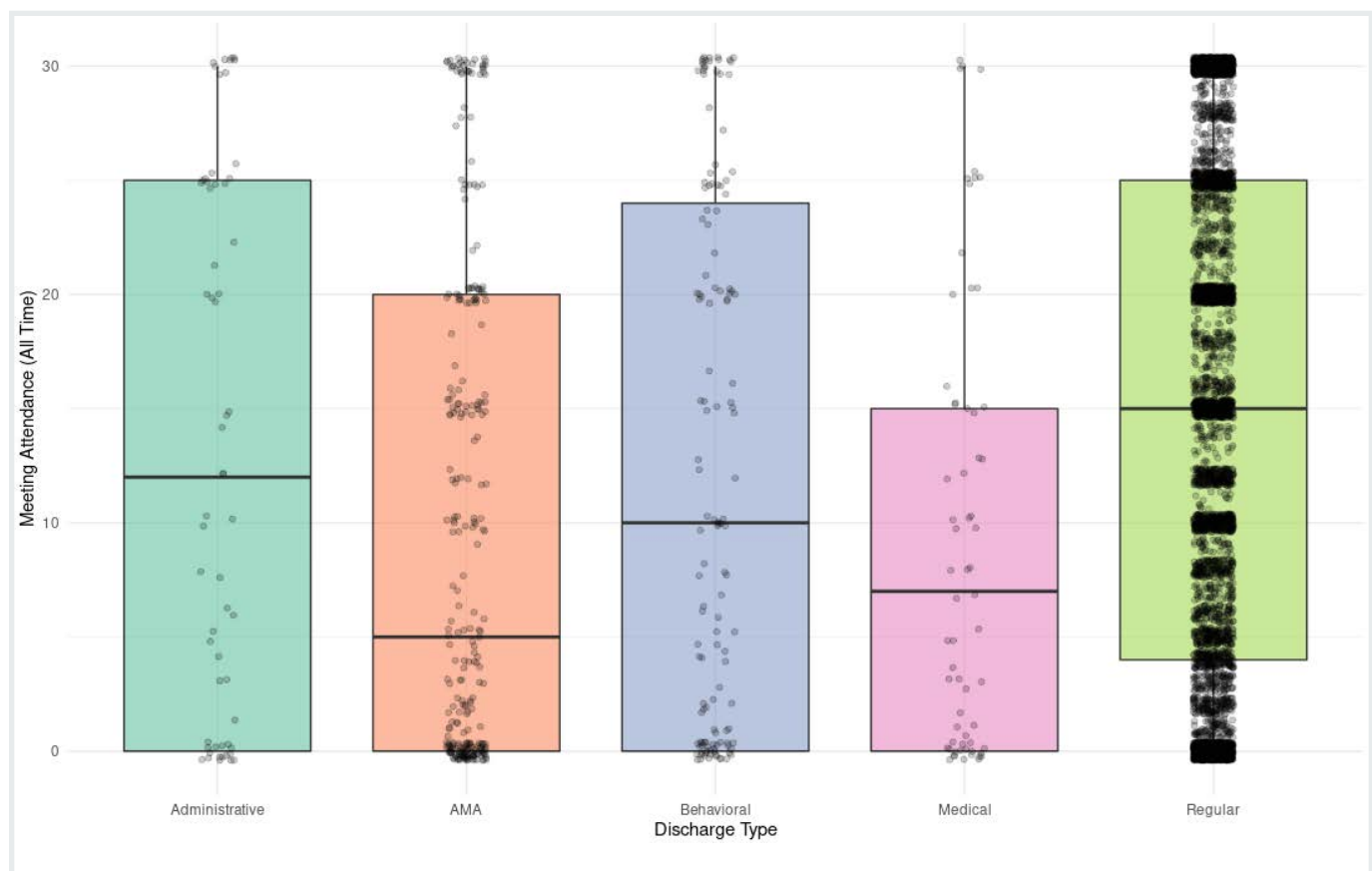
### *Length of Stay and Meeting Attendance*

Do patients who participate in longer lengths of care participate in more recovery activity? The below visualization highlights the significant linear relationship between Length of Stay and Meeting Attendance post-discharge treatment.
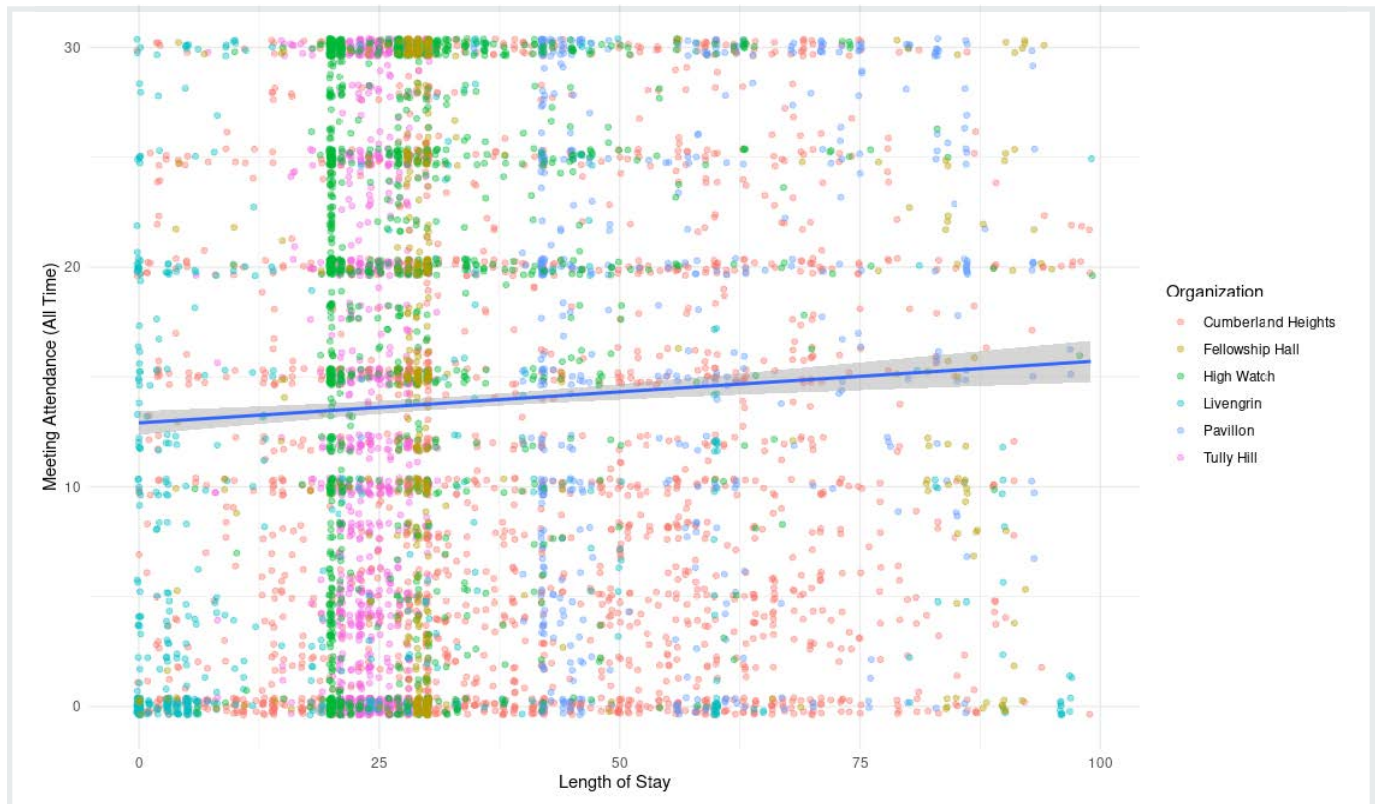


### *Use Days and Meeting Attendance*

Do patients who participate in longer lengths of care report less using days? The below visualization highlights the significant linear relationship between Length of Stay and Use Days post-discharge treatment.
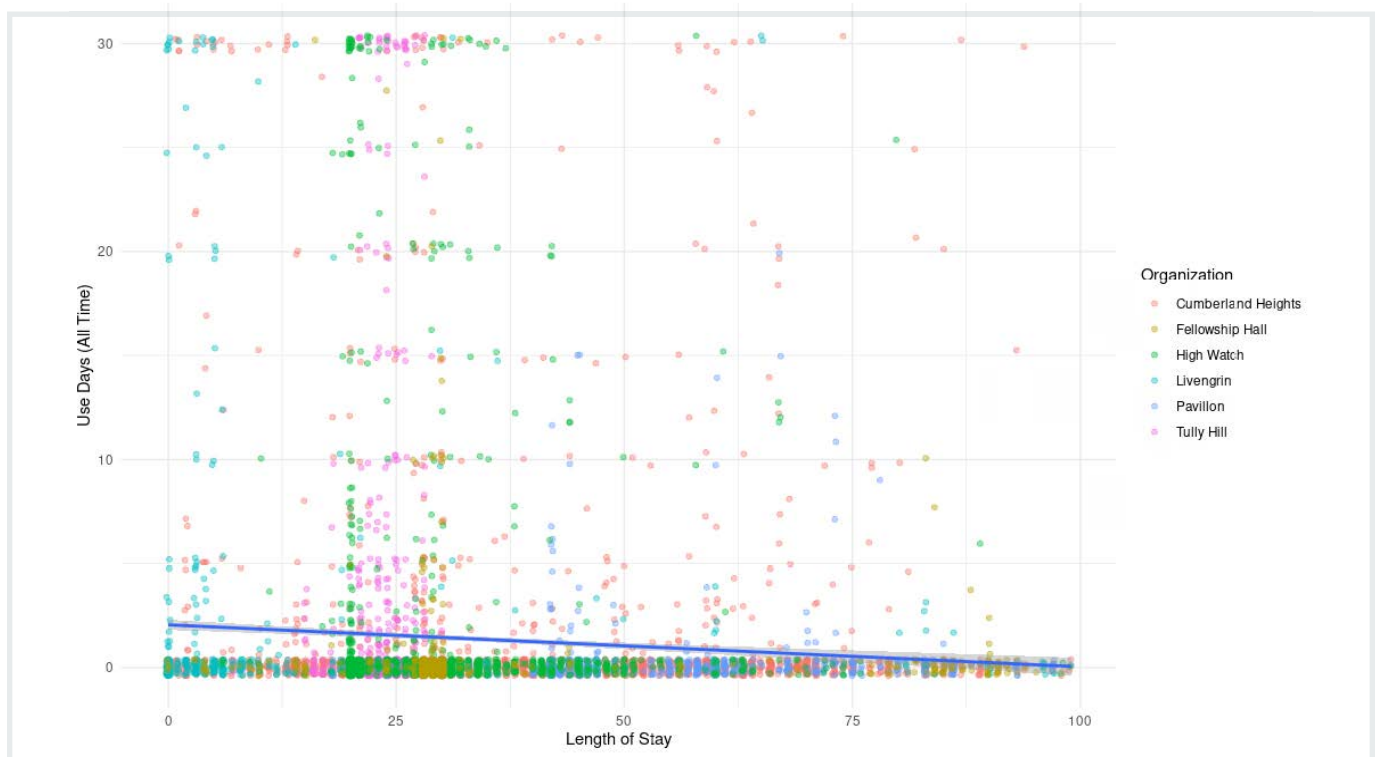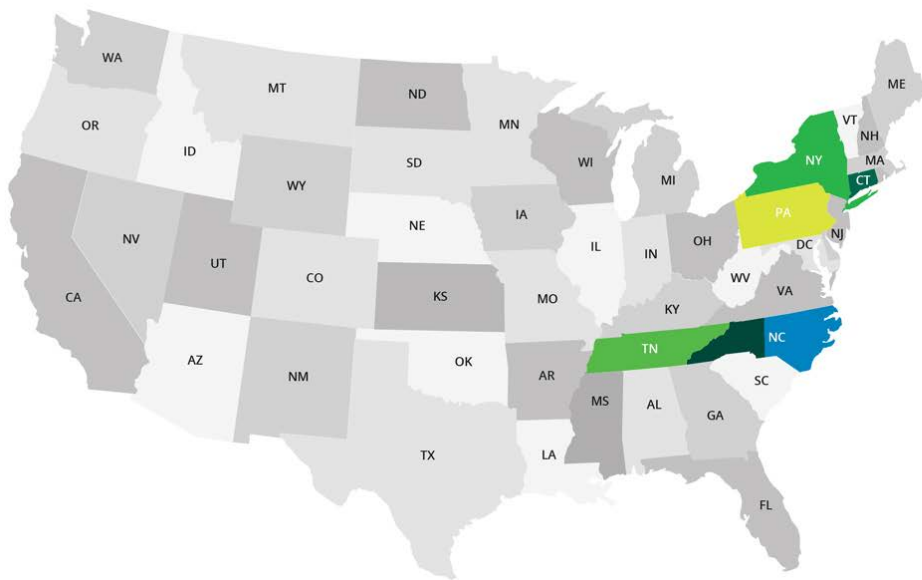
# About Us

### NONPROFIT
Each participating member is a Nonprofit Organization

### INVOLVEMENT
Collectively, we treat approximately **9,500 patients annually.**



### COMMITMENT
On average, our organizations have been serving those affected by addiction for **49 Years**.

### RECOGNITION
Each participating member is **accredited by The Joint Commission or The Commission on Accreditation of Rehabilitation Facilities.**

### TREATMENT
A majority of participating members use the following evidenced based practices: **CBT, MI, TSF, MAT, and DBT.**

### LEVELS OF CARE
Each participating member provides **Detox, Residential, Partial, Intensive Outpatient, and Outpatient levels of care.**

# Acknowledgements + References

1. Borsboom, D. (2006). The attack of the psychometricians. Psychometrika, 71(3), 425.

2. American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (DSM-5®). American Psychiatric Pub.

3. Marsch L. A. (2021). Digital health data-driven approaches to understand human behavior. Neuropsychopharmacology: official publication of the American College of Neuropsychopharmacology, 46(1), 191–196.

4. Vannicelli M. (1978). Impact of aftercare in the treatment of alcoholics: a cross-lagged panel analysis. Journal of studies on alcohol, 39(11), 1875–1886.

5. Costello R. M. (1980). Alcoholism aftercare and outcome: cross-lagged panel and path analyses. British journal of addiction, 75(1), 49–53.

6. Hoffmann N., Harrison P. (1988). CATOR Report: Treatment Outcome-Adult Inpatients Two Years Later. Ramsey Clinic Department of Psychiatry. St. Paul, MN, USA.

7. Mee-Lee D., Shulman G. D., Fishman M. J., Gastfriend D. R., Miller M. M. (2013). The ASAM Criteria: Treatment Criteria for Addictive, Substance-Related, and Co-Occurring Conditions. 3rd Ed. Carson City, NV: The Change Companies ®.

8. R Core Team (2020). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/.