

# 2018 Iowa Gambling Treatment Outcomes System: B. Treatment Services Report

**Prepared for**

*Iowa Department of Public Health*

*Division of Behavioral Health*

*Office of Problem Gambling Treatment and Prevention*



**Prepared by**

Ki H. Park

Mary E. Losch

Rodney Muilenburg



Center for Social and  
Behavioral Research

May 2018

For further information, contact:

Eric M. Preuss, MA, IAADC, CCS, Program Manager  
Office of Problem Gambling Treatment and Prevention  
Iowa Department of Public Health, Div. of Behavioral Health,  
Lucas State Office Building, Sixth Floor  
321 East 12th Street, Des Moines, IA 50319-0075  
(515) 281-8802; eric.preuss@idph.iowa.gov

Ki Park, PhD, Senior Research Scientist  
Center for Social and Behavioral Research  
University of Northern Iowa, Cedar Falls, IA 50614-0402  
(319) 273-2105; Ki.Park@uni.edu

or

Mary E. Losch, PhD, Professor and Director,  
Center for Social and Behavioral Research  
University of Northern Iowa, Cedar Falls, IA 50614-0402  
(319) 273-2105; Mary.Losch@uni.edu

*The views and conclusions expressed in this report are the authors and do not necessarily represent those of the Iowa Department of Public Health, Office of Problem Gambling Treatment and Prevention, or the University of Northern Iowa. This project was conducted under a contract between the University of Northern Iowa and the Iowa Department of Public Health.*

*This study was conducted by the Center for Social and Behavioral Research at the University of Northern Iowa under contract with and funding from the Iowa Department of Public Health, Office of Problem Gambling Treatment and Prevention.*

Citation: Park, K.H., Losch, M.E., & Muilenburg, R. (2018). 2018 *Iowa Gambling Treatment Outcomes System: B Treatment Services*. Cedar Falls, IA: Center for Social and Behavioral Research, University of Northern Iowa.

## ACKNOWLEDGMENTS

The authors would like to thank Eric M. Preuss, Mary Crawford, and Katrina Bee from the Office of Problem Gambling Treatment and Prevention at the Iowa Department of Public Health (IDPH), Div. of Behavioral Health, for their innumerable insights about the state treatment program and guidance of this work. A special thanks to Mary who provided ongoing data support from the I-SMART Problem Gambling Domain.

# TABLE OF CONTENTS

Acknowledgments.....	3
Executive Summary B: Treatment Services.....	5
Outcomes.....	5
Number of Gambling Days and Psychosocial Indicators .....	5
Multivariate Analysis: Length of Services (LOS) and Completion of Treatment .....	5
SECTION B1. Introduction .....	6
Admission, 30 Day Follow-up, and Discharge.....	6
SECTION B2. Treatment Outcome (Year 2015-2017).....	7
Outcome 1: Wait Time, Years 2015-2017 .....	7
Outcome 2: Treatment Services, Years 2015-2017 .....	11
Outcome 3: Admission, 30-day follow-up and Discharge.....	20
Paired Sample: Admission and 30-day follow-up (n=189) .....	20
Paired Sample: Admission and Discharge (n=182) .....	22
Repeated Measures: Admission, 30-day follow-up, and Discharge (n=70).....	24
SECTION B3. Retention and Outcomes (Year: 2015-2017) .....	27
Treatment Retention (Length of Services) .....	27
Treatment Completion.....	30

## EXECUTIVE SUMMARY B: TREATMENT SERVICES

---

*Prepared in May 2018, for the Iowa Department of Public Health, Iowa Gambling Treatment Program  
by the Center for Social and Behavioral Research, University of Northern Iowa*

---

### OUTCOMES

#### *Wait Time*

- The average wait time between intake and admission continues to be around seven days. However, about one in four patients were admitted the same day of their first contact.

#### *Treatment services*

- Receiving four or more services within 30 days from admission was associated with greater length of service (LOS) and completion of treatment plans. Likewise, recovery support services (RSS) and electronic-therapy (e-therapy) services were associated with greater length of service (LOS) and completion of treatment.
- Among patients who had discharge reasons, 72 percent received four or more services while in treatment. Nine in 10 patients who had a discharge reason received four or more services at the time of discharge. Regardless of the number of services, 29 percent of patients had a discharge reason of “completed treatment” or “substantially completed.”

### NUMBER OF GAMBLING DAYS AND PSYCHOSOCIAL INDICATORS

- The number of days that patients gambled in the past 30 days (seven days at admission) declined significantly from admission to 30-day follow-up time (two days at 30-day). This decline continued until patients’ discharge (one day at discharge).
- There are eight psychosocial indicators that are monitored and all improved between admission and discharge.

### MULTIVARIATE ANALYSIS: LENGTH OF SERVICES (LOS) AND COMPLETION OF TREATMENT

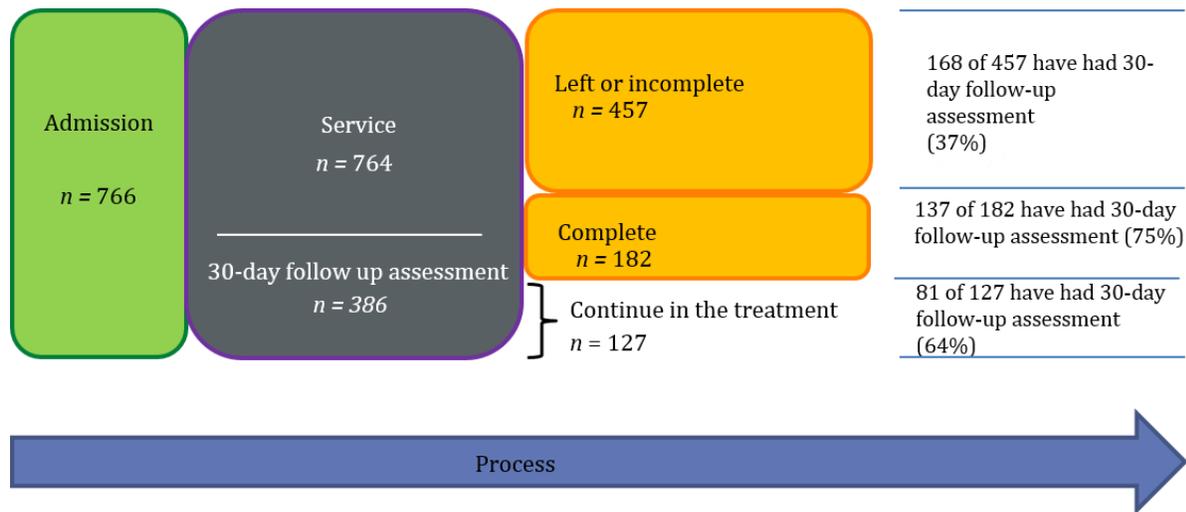
- Receiving four or more services within 30 days and receiving any RSS had a positive association with LOS. However, the length of services varied significantly across the programs even after controlling for all other covariates.
- Receiving four or more services within 30 days, receiving any recovery support services (RSS), and receiving any e-therapy services were associated with the completion of treatment. However, the proportion of patients whose discharge reason was either “completed treatment” or “substantially completed treatment” varied significantly across the programs even after controlling for all other covariates.

## SECTION B1. INTRODUCTION

The 2018 Iowa Gambling Treatment Outcomes (IGTO) Monitoring System report presents findings based on treatment and recovery support services data from the Problem Gambling Domain in the Iowa Service Management and Reporting Tool (I-SMART).

The purpose of the IGTO Monitoring System is to assess the patient outcomes of problem gambling treatment services funded via the Office of Problem Gambling Treatment and Prevention. The IGTO Monitoring System project has been reviewed by the Institutional Review Board (IRB) at UNI to ensure compliance with human participant research protections.

### ADMISSION, 30 DAY FOLLOW-UP, AND DISCHARGE



**Figure B.1.** Process and number of patients

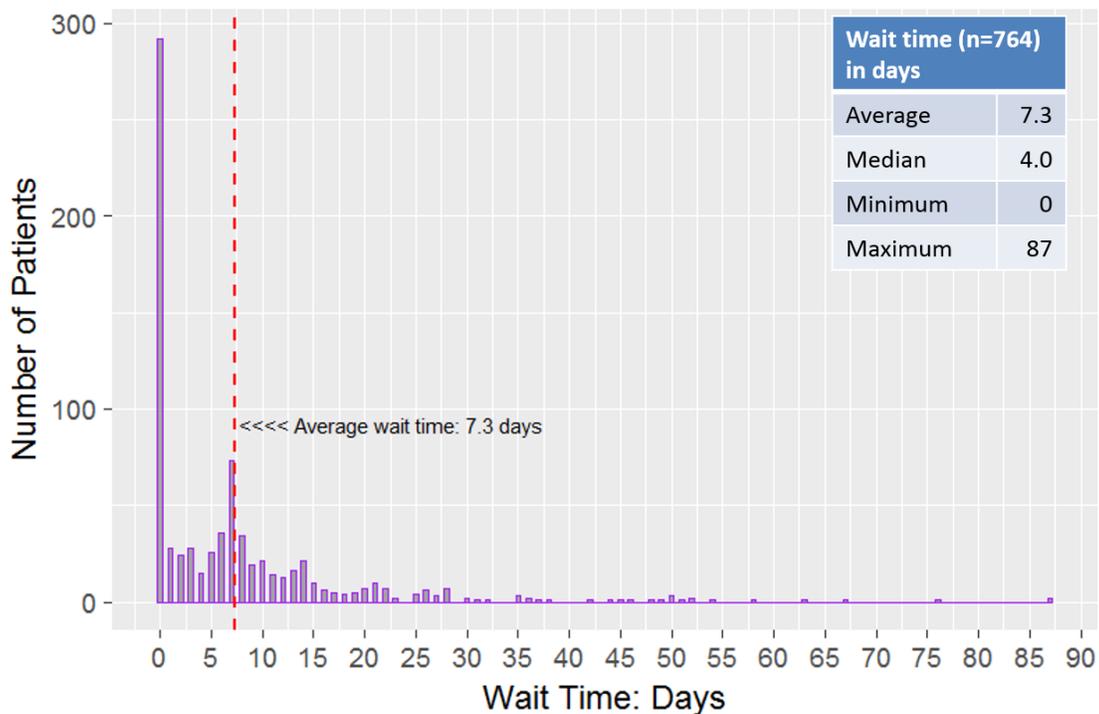
## SECTION B2. TREATMENT OUTCOME (YEAR 2015-2017)

Treatment outcomes in this section focused on the following outcomes:

- Wait time
- Treatment services in relation to retention and discharge reason
- Paired analyses between admission, 30-day follow-up and discharge

### OUTCOME 1: WAIT TIME, YEARS 2015-2017

Wait time is computed by the number of days from first date of contact to admission date. A total of 766 patients were admitted in 2015-2017. Of these, 764 patients had wait time information available (see Figure B.2). The average wait time from initial intake to admission was 7.3 days. The performance measure for Admission Wait Time is be in 10 or fewer days from first date of contact. Average wait time has remained constant by year.



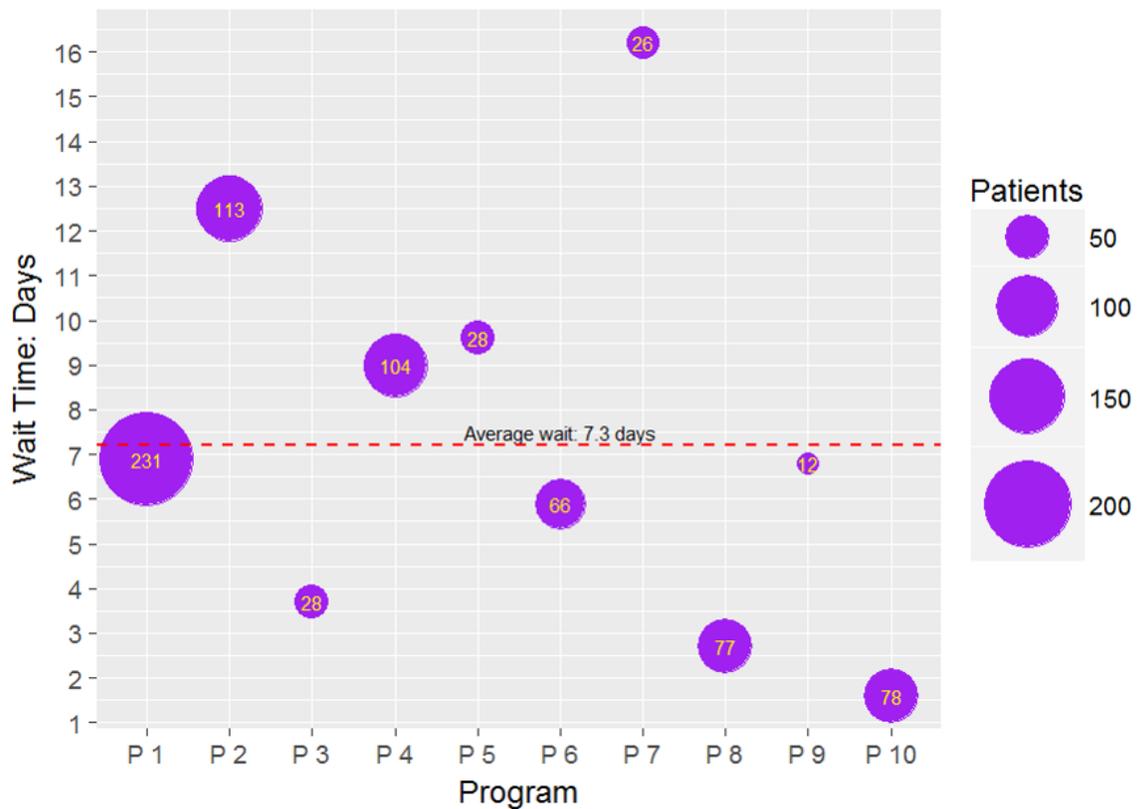
**Figure B.2.** Number of patients by wait time until admission

*Wait times by treatment program*

The number of admitted patients varied noticeably by program ranging from 26 to 231. The average wait was between two and 16 days across programs (see Table B.1 and Figure B.3).

**TABLE B.1.** Descriptive statistics for wait times by treatment program

	Program				
	P1	P2	P3	P4	P5
<b>Patients</b>	n=231	n=113	n=28	n=104	n=28
<b>Average wait days</b>	6.9	12.5	3.7	9.0	9.6
<b>Minimum</b>	0	0	0	0	0
<b>Maximum</b>	63	87	15	58	48
	Program				
	P6	P7	P8	P9	P10
<b>Patients</b>	n=66	n=26	n=77	n=12	n=78
<b>Average wait days</b>	5.9	16.2	2.7	6.8	1.6
<b>Minimum</b>	0	0	0	0	0
<b>Maximum</b>	76	87	36	31	28



**Figure B.3.** Average wait times by program

*Wait times and main outcomes (length of service & discharge reason<sup>1</sup>)*

In 2015-2017, 776 patients were admitted and 639 patients had a discharge reason.

- Length of service (LOS)<sup>2</sup> was compared between those who waited less than a week and more than a week to be admitted. Although patients admitted within a week received more of services, this difference was not statistically significant (Table B.2 shows the sample average in treatment services).

**TABLE B.2.** Wait times by length of service (LOS)

Wait times		Service count	Service time (minutes)
<b>0-7 days (n=436)</b>	Average	12.3	818
	Minimum	1	45
	Maximum	101	6750
<b>8 or more days (n=203)</b>	Average	10.9	675
	Minimum	1	45
	Maximum	82	5835
<b>Total (n=639)</b>	Average	11.9	772
	Minimum	1	45
	Maximum	101	6750

- Average of wait time for patients who completed the treatment was 6.9 days and it was slightly longer than the wait time among those who did not complete the treatment (eight days). However, this difference was not statistically significant (see Table B.3).

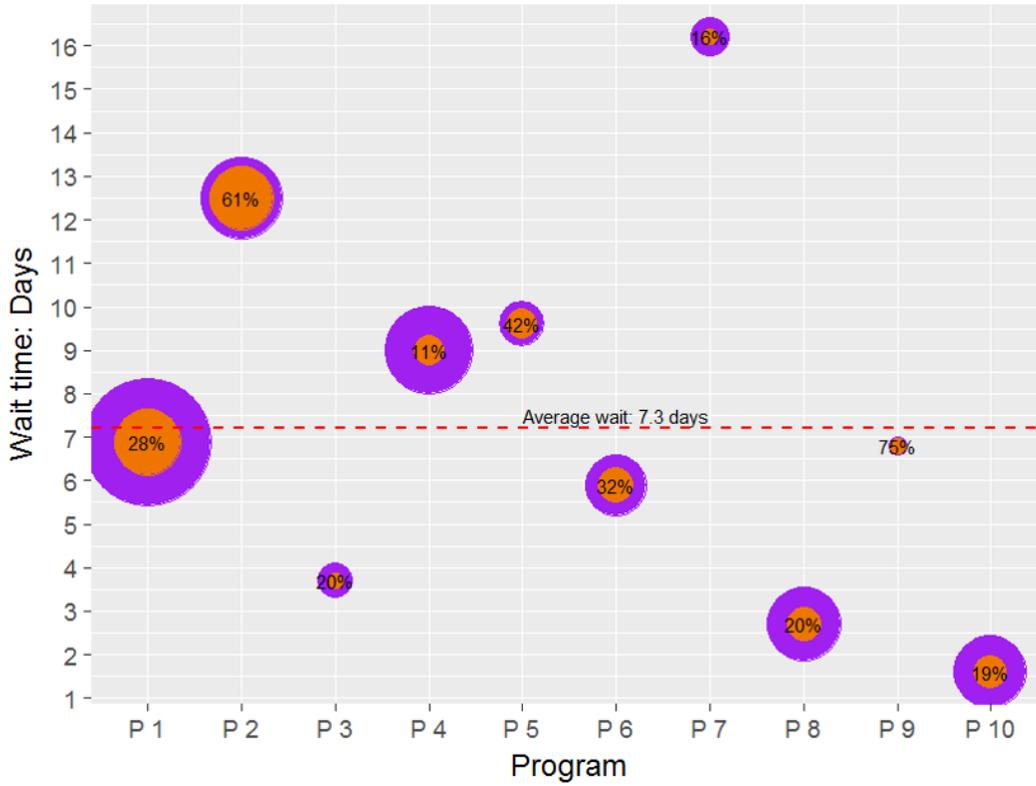
**TABLE B.3.** Wait times by discharge reason

Wait times	Complete treatment plan n=181	Incomplete treatment plan n=457
Average	8.1	6.9
Minimum	0	0
Maximum	87	67

<sup>1</sup> Discharge reason is defined as follow in the report: 'Completed treatment' or 'substantially completed' were aggregated into "Complete". 'Client left', 'Death', 'Incarcerated', 'Lack of progress', and 'referred outside' were aggregated into "Incomplete".

<sup>2</sup> LOS can be assessed in two ways: 1) Aggregated count of number of services by patients, and 2) Aggregated length of time of services received by patients.

Completion of treatment varied across programs (see Table B.4). For instance, Program 2 (P 2) had an average wait time of eight days to be admitted and 61 percent of patients who were admitted completed treatment.



**Figure B.4.** Wait times and treatment completion by program

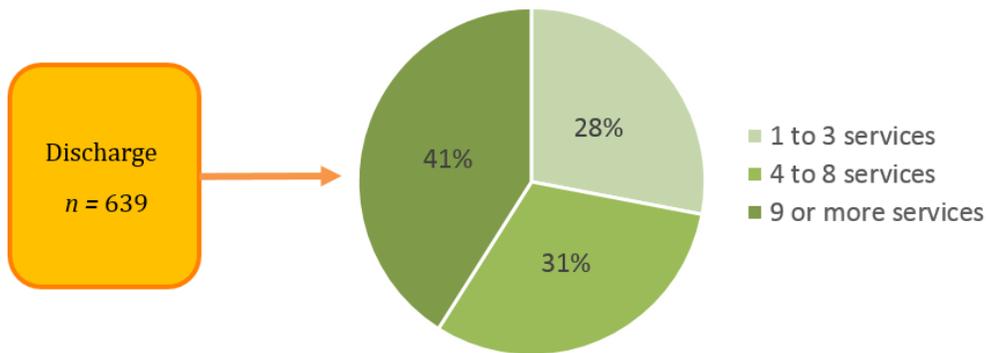
## OUTCOME 2: TREATMENT SERVICES, YEARS 2015-2017

In this section, associations between treatment services with main outcomes of problem gambling treatment are examined. The following pages use information on the group of patients who have both admission and discharge records (n=639). The rest of the patients (n=127) continue to participate in treatment and are not part of this outcome analysis.

Discharge reason is given at the time of completion of treatment plan (29%) or when it is necessary to close the patient's file due to different reasons (71%) such as 'client left' or 'referred outside.' The "completed treatment" includes: 1) Completed the treatment plan, or 2) Substantially completed treatment plan. The "incomplete treatment" includes: 1) Client left, 2) Death, 3) Incarcerated, 4) Lack of progress, or 5) Referred outside.

### *Services received (regardless of discharge reason)*

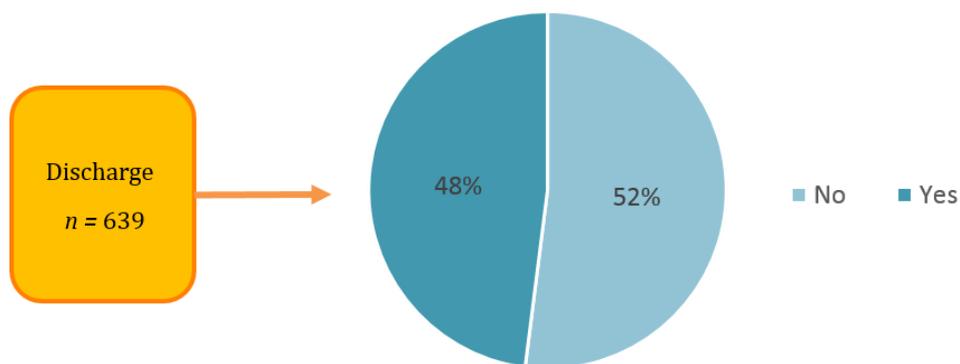
Among those patients who were discharged, more than two in three received four or more services while in treatment. About four in 10 patients received nine or more services before discharging from services (see Figure B.5).



**Figure B.5.** Services received before discharge from services

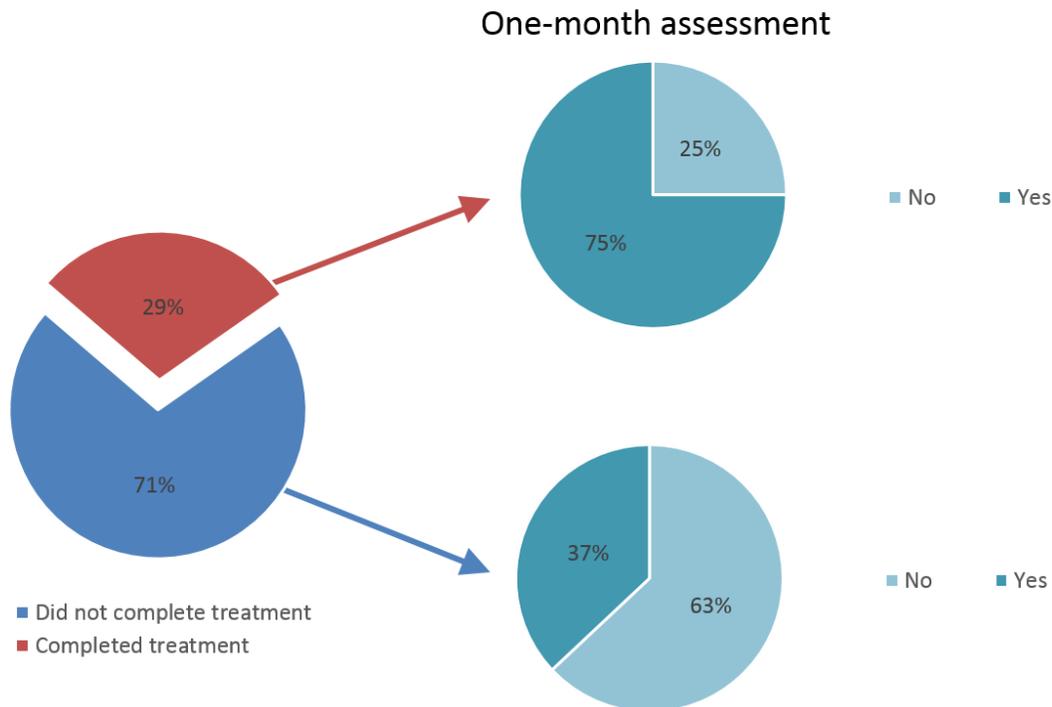
### *30-day Follow-up*

About half of discharged patients participated in the 30-day follow-up (see Figure B.6).



**Figure B.6.** Thirty-day follow-up received before receiving discharge reason

The proportion of 30-day follow-ups was significantly different between patients who completed and who did not complete treatment as shown in Figure B.7. Among those who completed treatment, 75 percent of patients had 30-day follow-ups.



**Figure B.7.** Thirty-day follow-ups received among patients discharged from services

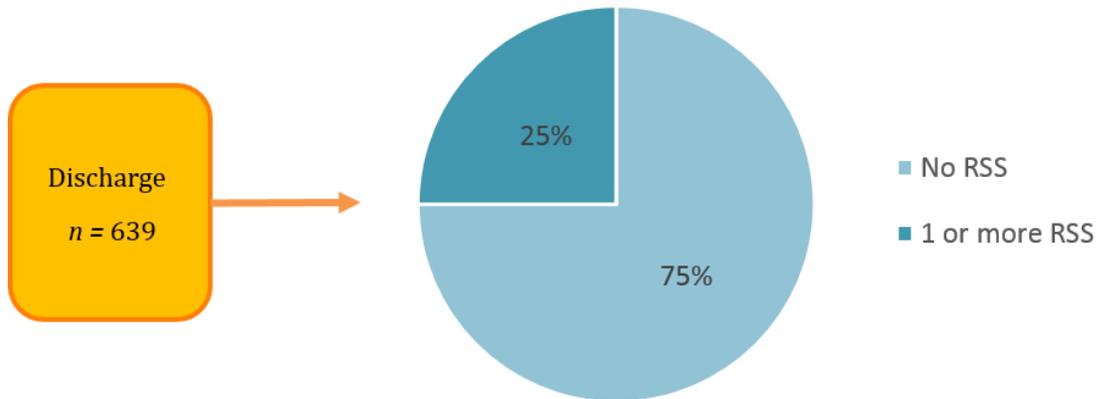
The length of time between admission and 30-day follow-up varies greatly (see Table B.4). The most common length between admission and 30-days follow-up assessment was 40 days. About one in seven patients were assessed between 31 to 45 days from admission.

**TABLE B.4.** Length of time between admission and 30-day follow-up

30-day Follow-up (days)	Patient left or did not complete treatment (n=457)	Completed treatment (n=182)	Total (n=639)
1-15 days	<1%	1%	<1%
16-30 days	7%	13%	9%
31-45 days	15%	36%	21%
46-60 days	7%	13%	9%
61-75 days	2%	5%	3%
76-90 days	2%	2%	2%
91 days or more	3%	6%	4%
No assessment	63%	25%	48%

*RSS received*

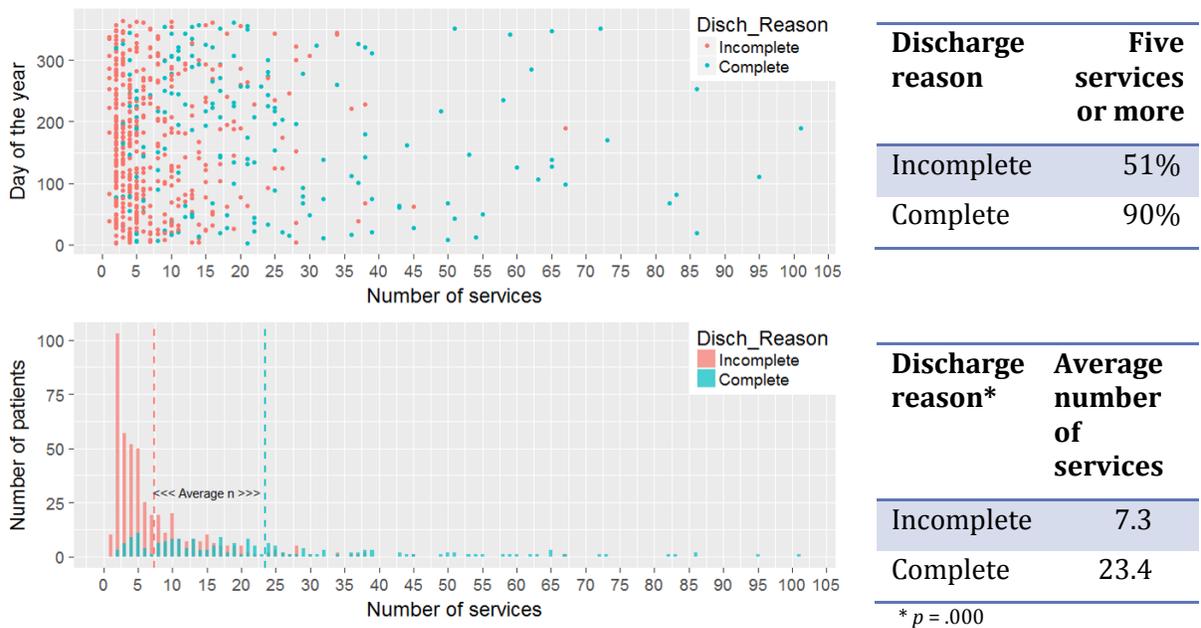
About one in four patients discharged from services also received one or more RSS services while in treatment (see Figure B.8).



**Figure B.8.** Proportion of patients who RSS received before discharge from services

*Total number of services<sup>3</sup> at the time of discharge (n=639)*

The average number of services<sup>4</sup> was significantly higher for those who completed treatment; however, a substantial number of patients who did not complete treatment (51 percent) also received five or more services (see Figure B.9).



**Figure B.9.** Total number of services by discharge reason

<sup>3</sup> Total number of services includes Coordination of Care and Recovery Support Services (RSS)

<sup>4</sup> The average number of services is noted as dotted lined in the Figure 2.3.

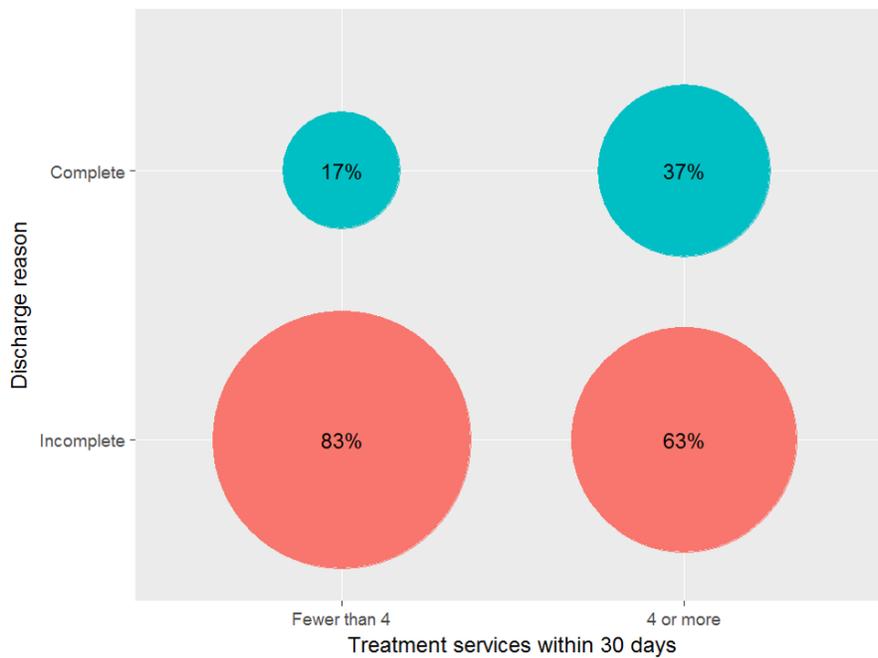
*Four or more services<sup>5</sup> within 30 days and discharged from services*

Patients who received four or more services within the first 30 days after admission were more likely to complete their treatment compared to those who received fewer than four treatment services (see Table 2.5 and Figure B.10).

**TABLE 2.5.** Discharge reason by number of services received within 30 days

Discharge reason*	Within 30 days	
	Fewer than 4 services n = 282	4 or more services n = 357
Incomplete	83%	63%
Complete	17%	37%

\*p = .000



**Figure B.10.** Treatment services received within 30 days after admission by discharge reason.

<sup>5</sup> Total number of services includes Coordination of Care and Recovery Support Services (RSS)

*Four or more treatment services within 30 days and length of service*

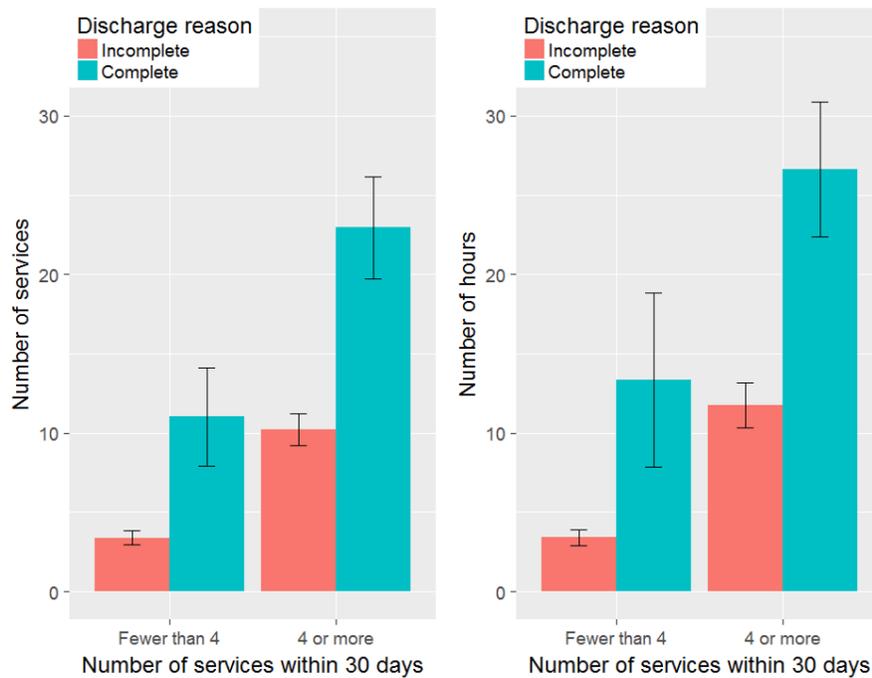
Patients who received four or more services within the first 30 days after admission were more likely to have a higher number and duration (total hours of services) of treatment sessions compared to those who received fewer than four treatment services (see Table B.6).

**TABLE B.6.** Treatment services by number of services received within 30 days

Treatment services	Within 30 days	
	Fewer than 4 services n = 282	4 or more services n = 357
Average number of sessions <sup>6</sup>	5.2	17.2
Average LOS time <sup>7</sup>	5.4 hours	18.8 hours

\*p = .000

Patients who did not complete treatment but received four or more services in the first 30 days received as many treatment sessions as those who completed treatment and did not receive four or more services in the first 30 days (see Figure B.11).



**Figure B.11.** Treatment services count and hours within 30 days by discharge reason

<sup>6</sup> The average number of “sessions” do not include Coordination of Care and Recovery Support Services (RSS).

<sup>7</sup> The average number of LOS does not include Coordination of Care and Recovery Support Services (RSS).

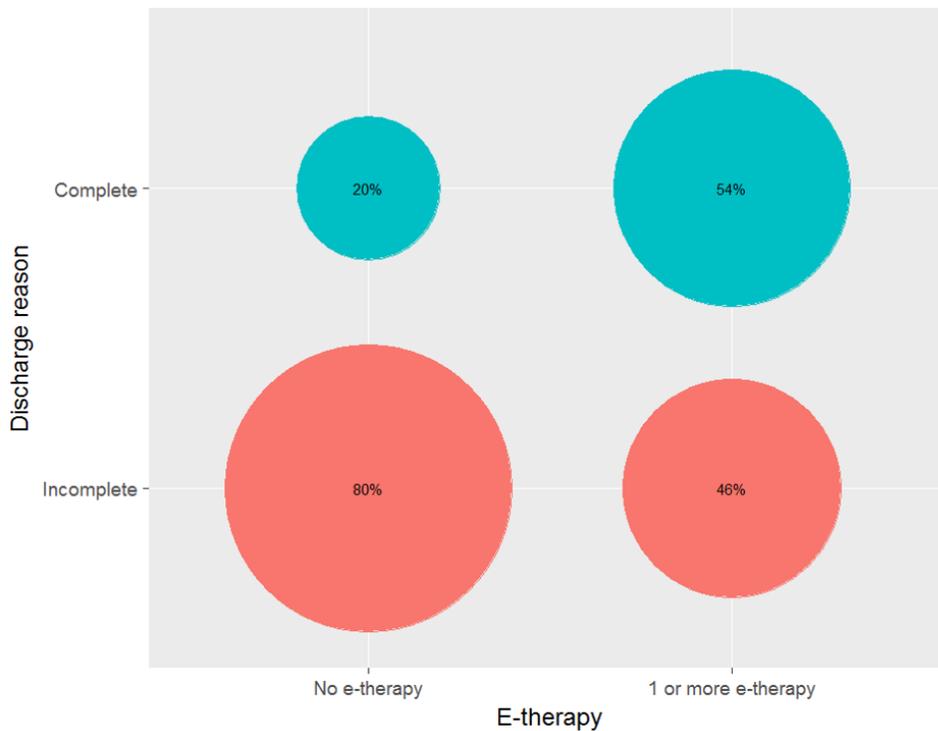
*E-therapy<sup>8</sup> and discharge reason*

Patients who received e-therapy were more likely to complete treatment than those who did not receive e-therapy (see Table B.7 and Figure B.12). More than half of patients (54 percent) who received one or more e-therapies completed treatment compared to 20 percent of patients who did not received e-therapy who completed treatment.

**TABLE B.7.** Discharge reason by e-therapy services received

Discharge reason*	e-therapy	
	No e-therapy n = 485	1 or more e-therapies n = 152
Incomplete	80%	46%
Complete	20%	54%

\**p* = .000



**Figure B.12.** E-therapy and discharge reason

<sup>8</sup> E-therapy is the provision of a crisis and/or treatment service via technology (phone, web, chat, text, video, etc.).

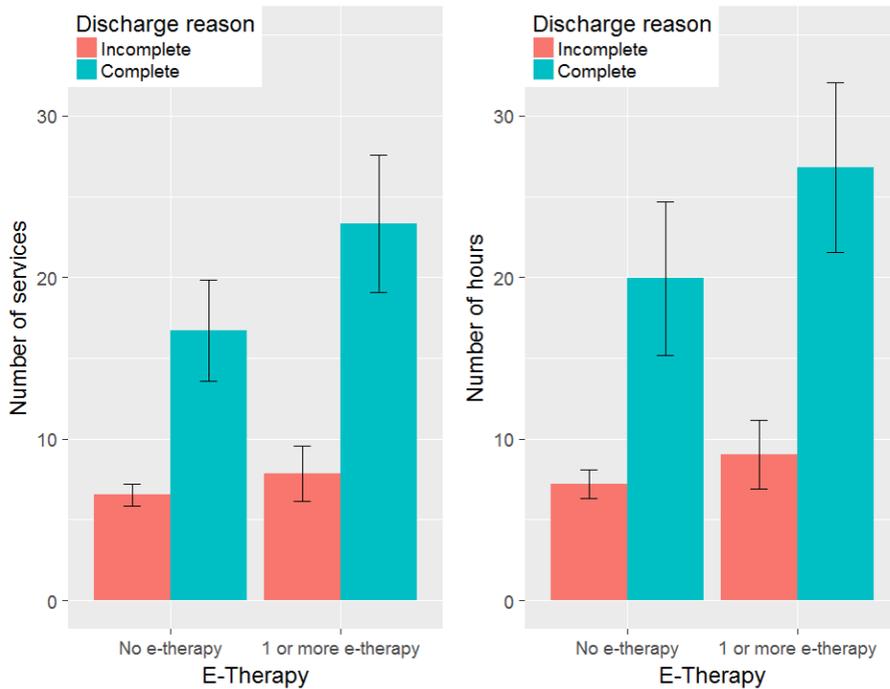
*E-therapy and length of service*

The average number of sessions and average LOS time for those who received e-therapy was significantly higher than it was for those who did not received e-therapy (see Table B.8). However, the overall effect to length of treatment among those who were discharged from services was modest (Figure B.13).

**TABLE B.8.** Treatment services by number of e-therapy services received

Treatment services <sup>9</sup>	No e-therapy n = 485	1 or more e-therapies n = 154
Average number of sessions*	8.6	16.2
Average LOS time	9.8 hours	18.6 hours

\* $p = .000$



**Figure B.13.** E-therapy counts and hours by discharge reason

<sup>9</sup> The treatment services in this table does not include the e-therapy, care coordination, or RSS.

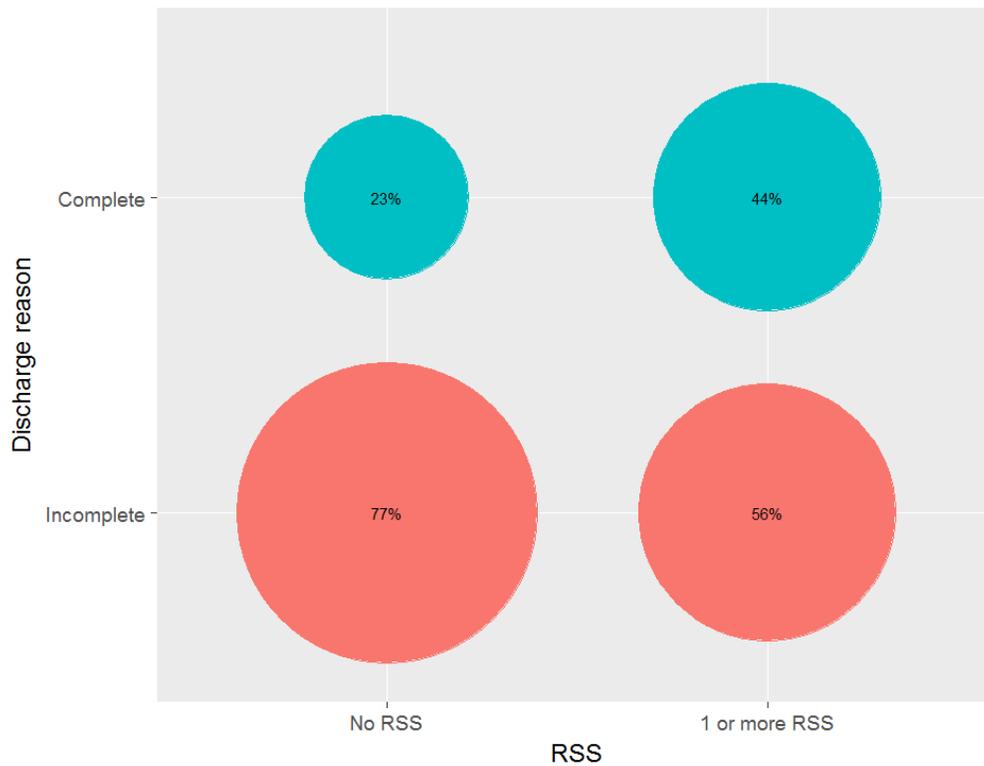
*Recovery support services (RSS) and discharge reason*

Patients who received one or more RSS were more likely to complete treatment (44 percent) compared to those who did not receive (23 percent) any RSS (see Table B.9 and Figure B.14).

**TABLE B.9.** Discharge reason by number of RSS received

Discharge reason*	RSS	
	No RSS n = 476	1 or more RSS n = 163
Incomplete	77%	56%
Complete	23%	44%

\*p = .000



**Figure B.14.** Recovery support services (RSS) and discharge reason

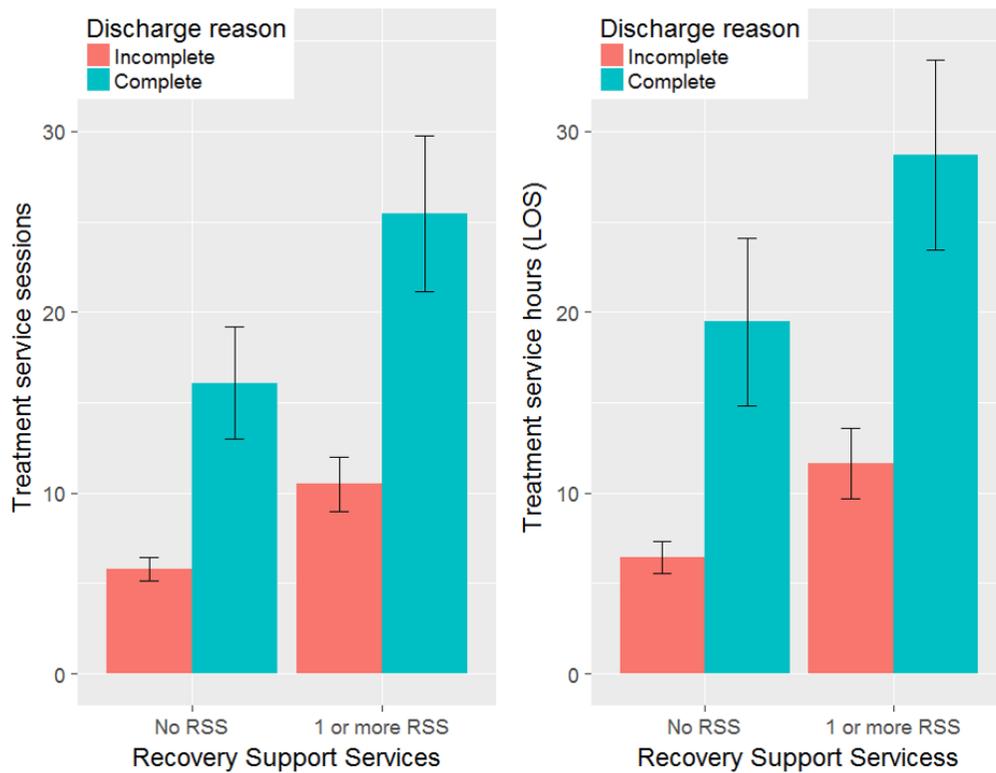
*Recovery support services (RSS) and length of service*

Patients who received one or more RSS received significantly greater numbers of services and had longer lengths of services overall compared to those who did not receive these types of services (see Table B.10 and Figure B.15).

**TABLE B.10.** Treatment services by number of RSS received

Treatment services	RSS	
	No RSS n = 476	1 or more RSS n = 163
Average number of sessions*	8.9	20.5
Average LOS time*	10.0 hours	21.3 hours

\* $p = .000$



**Figure B.15.** Recovery support services count and hours by discharge reason

### OUTCOME 3: ADMISSION, 30-DAY FOLLOW-UP AND DISCHARGE

#### *PAIRED SAMPLE: ADMISSION AND 30-DAY FOLLOW-UP (N=189)*

As noted in the in Outcome 2 (see Table B.11), the 30-day follow-up was intended to be done within a time frame of 30-45 days after admission. For the analysis below, only patients who completed the 30-day follow-up between 30 days and 45 days after admission were compared in gambling behaviors and psychosocial indicators at the time of admission and 30-day follow-up.

**TABLE B.11.** Thirty-day follow-up within the 30-45 days after admission

<b>30-day follow-up</b>	n	%
Yes	189	25%
No	577	75%

#### *Days gambled in the past 30 days between admission and 30-day follow-up*

Number of days gambled in the past 30 days at the time of 30-day follow-up was significantly fewer than at the time of admission<sup>10</sup> (see Table B.12 and Figure B.16).

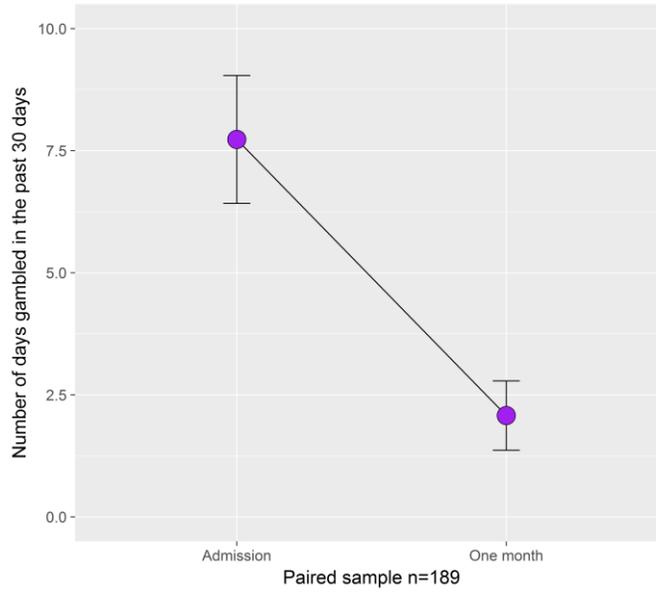
**TABLE B.12.** Average number of days gambled by discharge reason

<b>Time of assessment</b>	<b>Average number of days gambling in the last 30 days (n = 189)</b>
Admission	7.7
One-month	2.1

\* $p = .000$

---

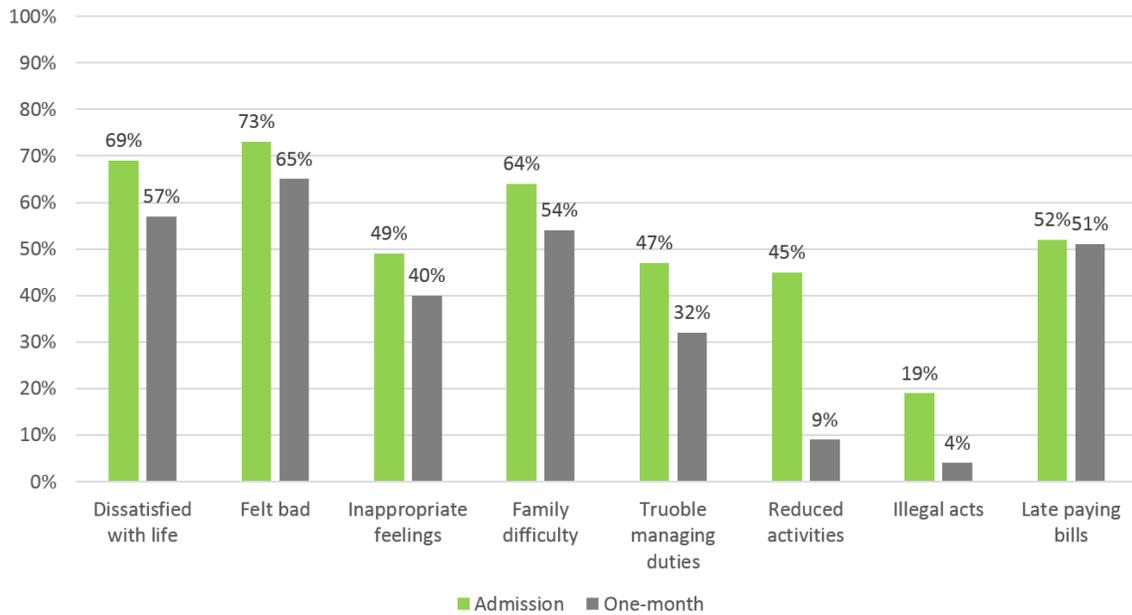
<sup>10</sup> Paired samples  $t$ -tests are a special case of  $t$ -test. A paired sample refers to two comparison samples – either that they are matched on some set of similar units or that the same individuals are measured at two different points in time. The current data reflect the latter case.



**Figure B.16.** Number of days gambled in the past 30 days at admission and 30-day follow-up

*Psychosocial indicators in the past 30 days between admission and 30-day follow-up*

There are nine psychosocial indicators assessed at admission and follow up. After a month in the treatment program, patients reported about a 10 percent decline in all indicators except for “late paying bills” (see Figure B.17).



**Figure B.17.** Psychosocial indicators at admission and 30-day follow-up

*PAIRED SAMPLE: ADMISSION AND DISCHARGE (N=182)*

There were 182 patients who completed treatment. Admission and discharge data were available for the patients' gambling behaviors and Diagnostic and Statistical Manual of Mental Disorders (DSM-5) diagnoses.

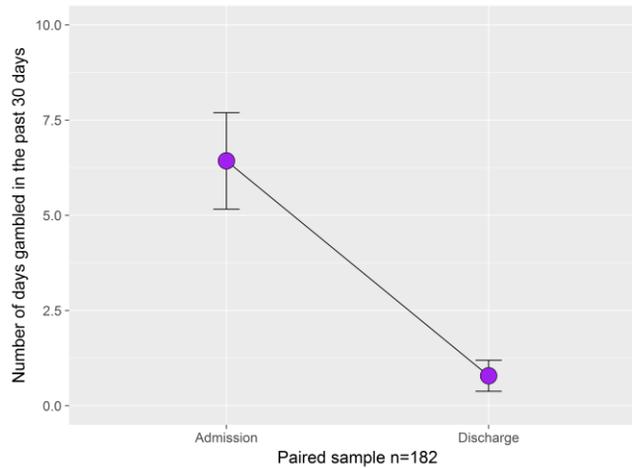
*Days gambled in the past 30 days between admission and discharge*

Number of days gambled in the past 30 days at the time of discharge was significantly fewer than at the time of admission<sup>11 12</sup> (see Table B.13 and Figure B.18).

**TABLE B.13.** Average number of days gambled by discharge reason

Discharge reason*	Average number of days gambling in the last 30 days (n = 182)
Admission	6.4
Discharge	0.8

\* $p = .000$



**Figure B.18.** Number of days gambled in the past 30 days at admission and discharge

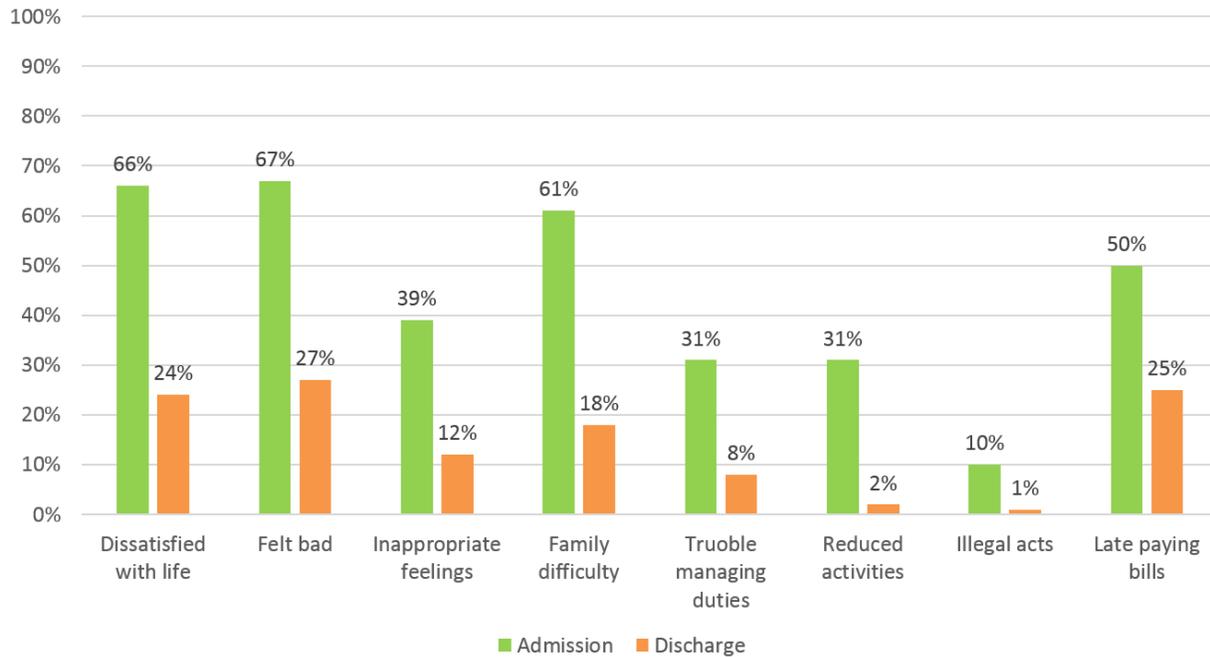
*Psychosocial indicators in the past 30 days between admission and discharge (n=147)*

Although there were 182 patients discharged, only 147 had the psychosocial indicators present at both admission and discharge.

<sup>11</sup> Paired sample  $t$ -test ( $n=38$ ) was performed. One of the 39 patients did not have information about his/her gambling at the time of discharge.

<sup>12</sup> Paired samples  $t$ -tests are a special case of  $t$ -test. A paired sample refers to two comparison samples – either that they are matched on some set of similar units, or the same individuals are measured at two different points in time. The current data reflect the latter case.

There are nine psychosocial indicators assessed at admission and discharge. Patients reported significant decline in all indicators (see Figure B.19).



**Figure B.19.** Psychosocial indicators at admission and 30-day follow-up

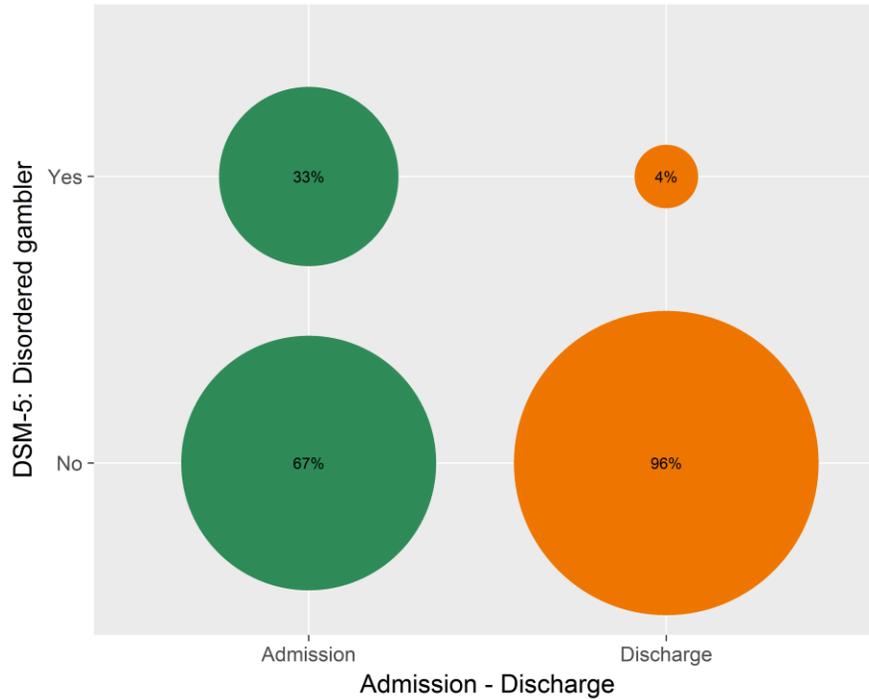
*Gambling disorder between admission and discharge*

Gambling disorder diagnosis with DSM-5 is one of the key measures in the recovery process of a patient. The DSM Indicator tool in I-SMART is completed as part of the discharge and was available for 182 patients. Of these, the clear majority of patients at the time of discharge reported no gambling disorder criteria (see Table B.14 and Figure B.20).

**TABLE B.14.** Proportions of disordered gambler diagnoses at admission and discharge

<b>Disordered gambler*</b>	<b>Admission n = 182</b>	<b>Discharge n = 182</b>
Yes	67%	4%
No	33%	96%

\*p = .000



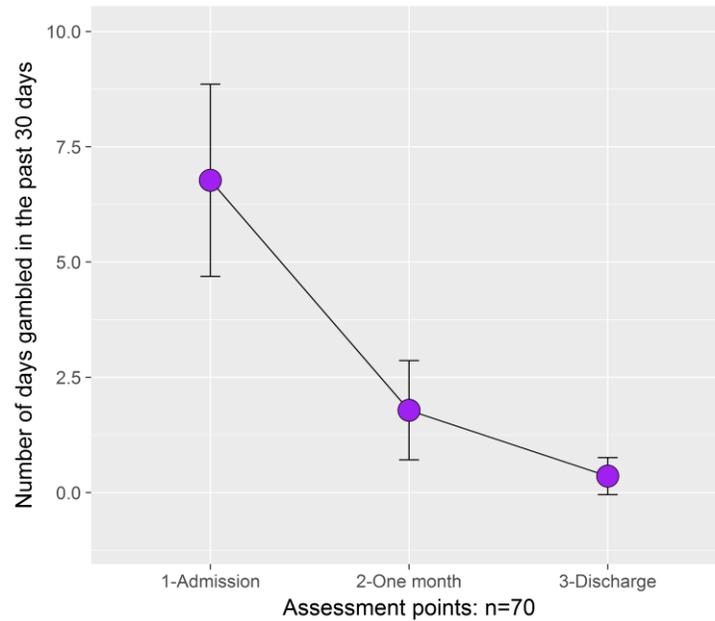
**Figure B.20.** DSM-5 classification between admission and discharge

*REPEATED MEASURES: ADMISSION, 30-DAY FOLLOW-UP, AND DISCHARGE (N=70)*

There were 70 patients who completed treatment had admission, 30-day follow-up (within 30-45 days after admission) and discharge data available. These patients' gambling behaviors and psychosocial indicators are shown below.

*Days gambled in the past 30 days (repeated measure: admission, 30-day follow-up, and discharge, n = 70)*

Among patients who were admitted and 30-day and discharge assessments were completed, the average number of days of gambling at admission was 6.8 days, 1.8 days at 30-day follow-up, and 0.4 day at discharge. This decline of day of gambling in the past 30 days was statistically significant:  $F(2, 138) = 30.53, p = .000$  (see Figure B.21).

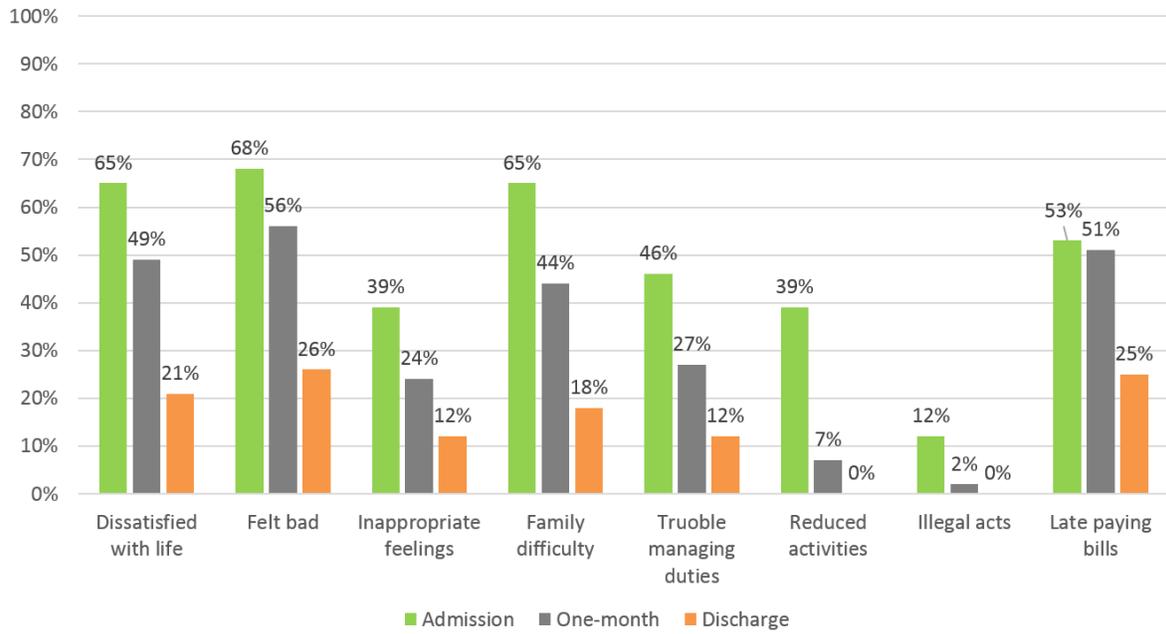


**Figure B.21.** Number of days gambled at admission, 30 Day Follow-up, and discharge

*Psychosocial indicators in the past 30 days between admission, 30-day follow-up, and discharge (n=57)*

Of these 70 patients, only 57 had psychosocial indicators reported at admission, 30-day follow-up, and discharge. The comparison between admission, 30-day follow-up and discharge for psychosocial indicators is based on these 57 patients.

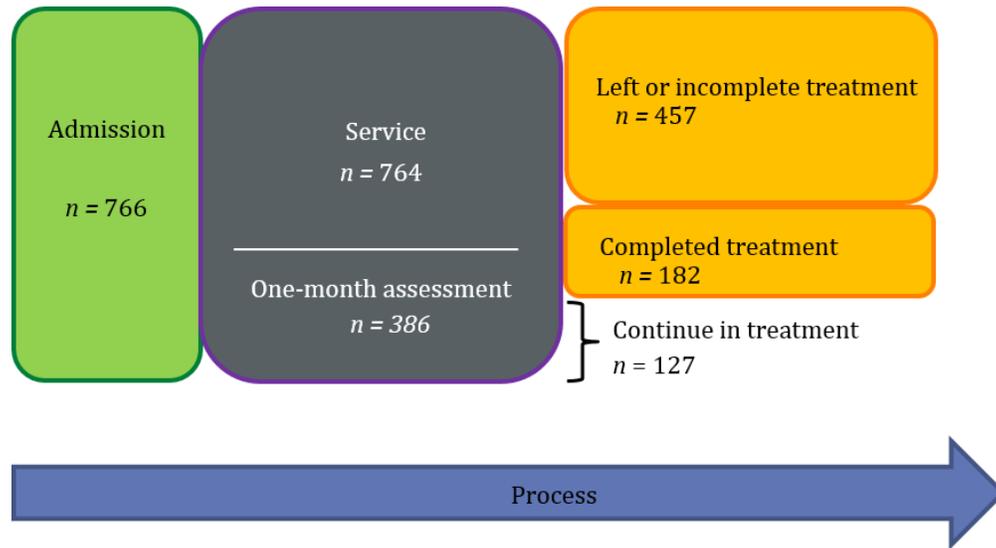
There were nine psychosocial indicators assessed at admission and discharge. Patients reported significant declines in all indicators (see Figure B.22). For instance, 65 percent of patients said they felt dissatisfied with life at the time of admission. This feeling was reduced to 49 percent at the 30-day follow-up and continued to decline to 21 percent at the time of discharge.



**Figure B.22. Psychosocial indicators at admission and 30-day follow-up**

## SECTION B3. RETENTION AND OUTCOMES (YEAR: 2015-2017)

To assess outcomes with multivariate analysis, all patients from January 2015 to December 2017 were aggregated. There were 776 patients who were admitted and had encounters entered (services provided) during this period. Of these, 639 patients were discharged with at least one record of service (see Figure B.23).

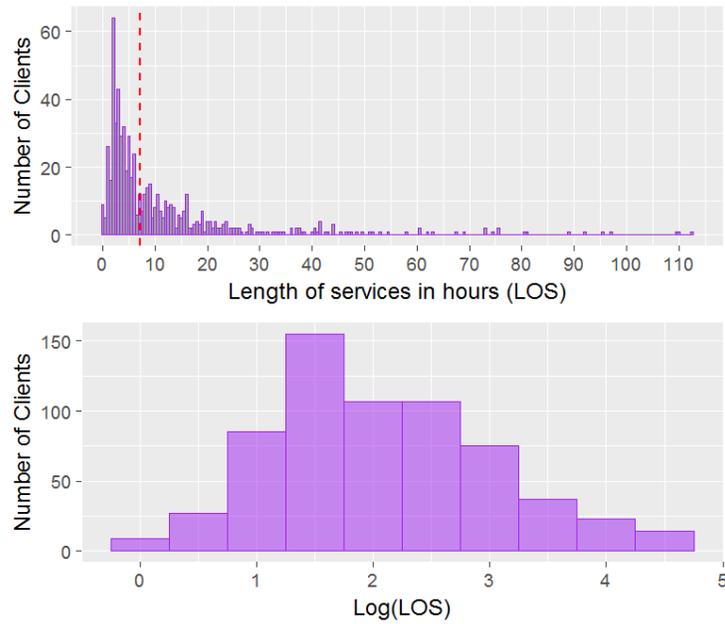


**Figure B.23.** Process and number of patients from admission to discharge in 2015 and 2017

### TREATMENT RETENTION (LENGTH OF SERVICES)

Treatment retention was assessed as the length of the services (LOS). Because of the distribution of the length of the services (see Figure 3-2, top), a natural logarithmic transformation was performed before modeling in a multivariate linear regression<sup>13</sup>. The length of service (in hours) with natural logarithmic transformation “log(LOS)” is shown in the Figure B.25. The number of patients in the model was 639.

<sup>13</sup> The model equation is  $\log(\text{LOS}) = \beta_0 + \beta_1 \cdot \text{gender} + \dots + \beta_k \cdot \text{RSS} + e_i$



**Figure B.24.** Length of service and its natural logarithmic transformation distributions

All categorical variables in the model were recoded into dummy variables (e.g. gender: 0 = Female, 1 = Male). The independent variables were:

- A) Demographics and individual characteristics such as age, education, etc.
- B) Substance abuse and mental health in the past 30 days: alcohol and tobacco use, and suicidal thoughts.
- C) Context: Programs<sup>14</sup>

### *Results*

Retention (length of service) was significantly higher for the following variables after keeping constant all other factors in the model (see Table B.15):

- The retention varied significantly by programs. Thus, patients were more likely to receive fewer services at some programs (Program, 4 and 8) compared to other patients at other programs in the state.
- Patients who received four or more services within 30 days of admission were more likely to receive more services overall than those who received three or fewer services within the first 30 days.
- Also, patients who received one or more RSS were more likely to receive more services overall than those who did not receive any RSS.

---

<sup>14</sup> The treatment programs are numbered from 1 to 10 as in the previous pages.

**TABLE B.15.** Linear regression for Log(LOS)

	<b>Unstandardized</b>		
	<b><math>\beta</math></b>	<b>SE</b>	<b><i>p</i></b>
$\beta_0$	1.461	0.145	
<b>DSM-5 (ref group: No)</b>			
Disorder Gambler (Yes)	0.032	0.073	0.663
<b>Stage of change (ref group: ready to change)</b>			
Changed already	0.042	0.065	0.513
<b>Age (ref group: 31-50 years)</b>			
18-30 years	-0.072	0.075	0.341
51-65 years	0.038	0.075	0.614
66 or older	0.068	0.122	0.581
<b>Gender (ref group: Female)</b>			
Male	0.021	0.061	0.730
<b>Marital status (ref group: divorced, separated, or widowed)</b>			
Single	0.042	0.080	0.598
Married or cohabitating	0.120	0.081	0.138
<b>Education (ref group: HS or less)</b>			
Some college or more	-0.003	0.062	0.965
<b>Employment (ref group: unemployed)</b>			
Employed	-0.106	0.068	0.117
<b>Month household income (ref group: \$4001 or more)</b>			
Less than \$1,000	-0.042	0.093	0.648
\$1,001 - \$2,000	-0.120	0.095	0.206
\$2,001 - \$4,000	0.027	0.087	0.759
<b>Substance use &amp; mental health (ref group: no)</b>			
Tobacco	-0.035	0.060	0.559
Alcohol	-0.008	0.065	0.897
Suicidal	0.100	0.080	0.214
<b>Program (ref group: programs 3, 5, 7, 9, 10)</b>			
Program 1	-0.191	0.096	0.046
Program 2	0.082	0.121	0.495
Program 4	-0.241	0.105	0.022
Program 6	0.545	0.116	0.000
Program 8	-0.317	0.120	0.009
<b>Treatment services (ref group: No)</b>			
4 + services within 30 days (Yes)	0.881	0.066	0.000
Any e-DT-therapy	0.051	0.084	0.541
Any RSS count	0.592	0.075	0.000

## TREATMENT COMPLETION

In this analysis, the dependent variable was coded as 1 = “Completed treatment” and 0 = “Did not complete treatment.” Due to missing data, the final number of patients in the analysis was 639. The final model excluded some variables that were not significant and the results are shown next.

The bivariate findings above were further examined using multivariate procedures. The purpose of these analyses was to determine the strongest predictors of retention and outcomes of treatment services when *all the potential factors are considered simultaneously*. Outcomes for this analysis (i.e., dependent variables) in this section were: patient demographics, substance abuse, DSM-5 diagnosis, and readiness for change in gambling behavior. In addition, treatment services were included in the overall model.

The analyses were conducted using IBM SPSS Statistics V22.0 and included Logistic Regression (for DS) and Linear Regression (for LOS) to estimate the odds ratios and their confidence intervals (CI). The retention (LOS) in the treatment program was determined by the number and cumulative time of treatment services after excluding coordination of care, e-therapy sessions and recovery service support. The treatment outcome (DS) was a binary variable (completed treatment or incomplete treatment). Respondents with missing values for any variable in the model were excluded from the analysis. Each of the independent variables used in the modeling were also categorical; thus, some numerical variables such as age were recoded.

The independent variables were:

- A) Demographics and individual characteristics such as age, education, etc.
- B) Substance abuse & mental health in the past 30 days: alcohol and tobacco use, and suicidal thoughts.
- C) Context: Programs<sup>15</sup>

The following pages summarize the findings. These tables show estimated regression coefficients, standard errors, 95% confidence intervals, *t*-test and *p*-values. For the logistic regression, reference subgroup for all covariates in the model is the first subgroup (as indicated in the figures). The following pages show only those covariates with *p*-values less than .05. It is important to note that caution should be used in generalizing the findings where wide confidence intervals are indicated (e.g., race and substance abuse).

### *Results*

Demographic characteristics were not significant in the model; however, stage of change was marginally significant in the model Change ready: 1.57 [CI: 0.99, 2.47].

The odds ratios for patients who received four or more treatment services within 30 days of admission, patients who received any e-therapy treatment services, and patients who received one or more RSS were also significant in the model (see Figure B.25).

- ❖ Four services within 30 days: 2.07 [CI: 1.27, 3.36]. Thus,

---

<sup>15</sup> The treatment programs are numbered from 1 to 10 as in the previous pages.

- patients who received four or more services were two times more likely to complete treatment compared to those who received fewer than four services within 30 days of admission.

❖ Any e-therapy services: 3.37 [CI: 1.94, 5.85]. Thus,

- patients who received any e-therapy services were three times more likely to complete treatment compared to those who did not receive any e-therapy services.

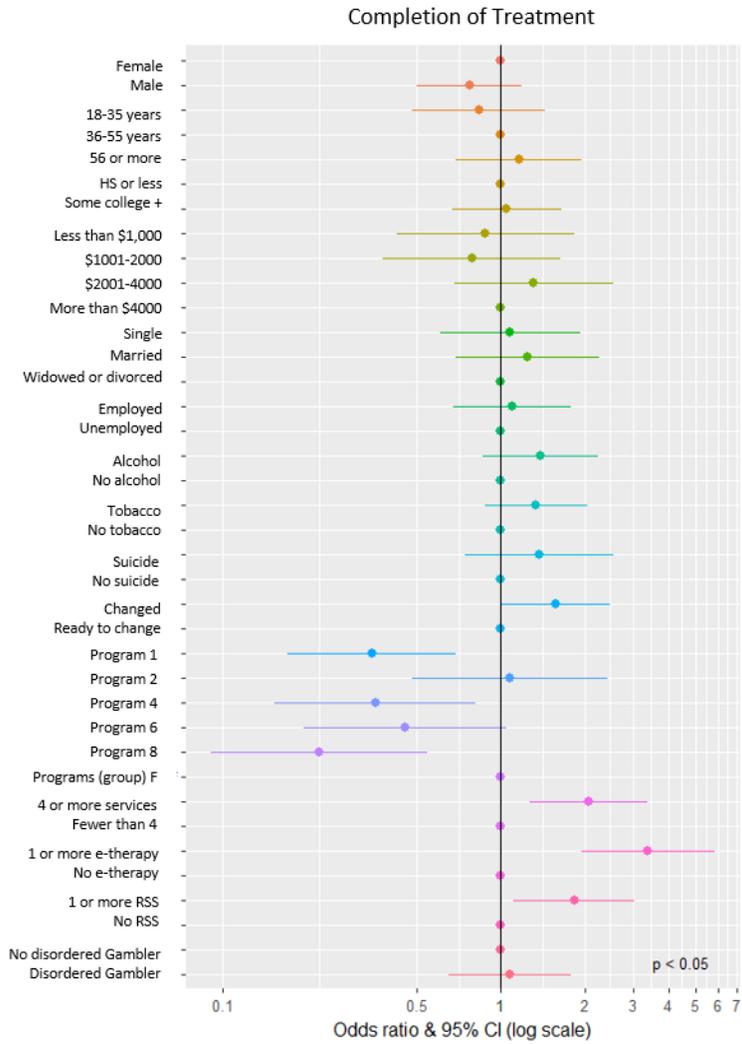
❖ Any RSS: 1.83 [1.11, 3.03]. Thus,

- patients who received any RSS were two times more likely to complete treatment compared to those who did not receive any RSS.

Also, treatment completion was significantly lower in two of the programs compared to others.

❖ Program 1: 0.34 [CI: 0.17, 0.69] & Program 4: 0.35 [0.15, 0.81]. Thus,

- patients who were admitted in these program were about 65 percent less likely to complete treatment compared to those patients admitted to other programs.



**Figure B.25.** Representation of regression coefficients (odds ratios) modeling treatment outcome: completion of treatment