Substance Abuse Treatment in Washington State:

Constructing Treatment Episodes and Analyzing Readmissions

An Interim Report

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Bill Luchansky, Ph.D.
Washington State Department of Social and Health Services
Research and Data Analysis

Lijian He, Ph.D.
Washington State Department of Social and Health Services
Research and Data Analysis

Department of Social and Health Services

Lyle Quasim, Secretary

Management Services Administration

Kennith Harden, Assistant Secretary

Division of Alcohol and Substance Abuse

Ken Stark, Director

Division of Research and Data Analysis

Elizabeth Kohlenberg, Director

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EXECUTIVE SUMMARY

Purpose

The purpose of this report is twofold: first, to create and describe treatment episodes using admission and discharge records from publicly funded clients in Washington State and second, to examine readmission to treatment after the end of an index episode.

Study Population

Our study population was all clients, between and including the ages of 18 and 64, who began and ended an episode of treatment in 1995. Washington State's Division of Alcohol and Substance Abuse (DASA) administers publicly funded treatment programs. DASA clients were placed in one of two groups, ADATSA or Non-ADATSA. The ADATSA program is designed for indigent clients deemed unemployable due to addiction. For them there is a distinct assessment, admission and treatment planning process. These clients were often treated in an inpatient setting. Other DASA clients, those without such severe deficits, typically receive outpatient treatment. In this report, they are referred to as Non-ADATSA clients.

Methods

Treatment Episodes

Treatment episodes were created to reflect a continuum of care, and whether successive admissions were considered part of the same episode depended on the amount of time between the discharge date from one admission and the admission date of the following admission. If that time was 30 days or less, then the admissions were grouped into a single episode. If that time was greater than 30 days, then the admissions were considered part of two separate episodes.

Analyses of Readmission

We wanted to know what factors (client characteristics and treatment experiences) were associated with a readmission to treatment. To address this issue, we used a type of survival analysis technique, proportional hazards regression.

Results

Treatment Episodes

Comparing ADATSA and Non-ADATSA clients, we found that:

- ADATSA clients were more likely to have episodes involving more than one admission to treatment (50% v. 4%).

- If admitted only once to outpatient treatment, ADATSA clients, when compared to Non-ADATSA clients, were much more likely to complete it (39% v. 10%).

- For episodes with more than one admission, ADATSA clients, when compared to Non-ADATSA clients, were much more likely to have at least one completion (91% v. 52%), and much more likely to complete the final admission (36% v. 19%).

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Analyses of Readmission

Descriptive Results

- Overall, 76% of clients did not return for additional treatment in the first year, and that figure rises to 88 % by the third year.

- Overall, most clients who were readmitted entered outpatient rather than inpatient treatment (17% v. 8% in the first year). In addition, readmissions to outpatient treatment declined in each successive year, (17% in the first year, 10% in the second, and 7% in the third).

- Only a small group of clients returned for inpatient treatment, regardless of their program type. Overall, 8% returned to inpatient in the first year and 6% in the second and third years.

Factors Associated with Readmission

For both ADATSA and Non-ADATSA clients, the following factors had significant effects on the risk of readmission to treatment:

- Completing Treatment: Those clients completing the index episode of treatment had lower risks of readmission than those who did not, ADATSA completers had a 19% lower risk of readmission while Non-ADATSA completers had a 37% lower risk.

- Type of Treatment: Those who had only inpatient treatment in their index episode had a higher risk of readmission than those who had only outpatient, 29% higher for ADATSA and 31% higher for Non-ADATSA.

- Gender: Males had a lower risk of readmission than females, 44% for ADATSA and 36% for Non-ADATSA.

- Arrests: Having an arrest or having treatment prior to the index episode increased the risk of readmission, 27% for ADATSA and 48% for Non-ADATSA.

The following factors had significant effects on the risk of readmission for just one type of DASA client:

- Primary Drug: Among ADATSA clients only, users of heroin and amphetamines/methamphetamines had lower risks of readmission (25% and 19%) than clients who used alcohol primarily.

- Mental Health Status: Among Non-ADATSA clients only, having a current mental health problem increased the risk of readmission to treatment by 20%.

INTRODUCTION

This study had two goals: the first, using data from the Washington State Division of Alcohol and Substance Abuse's (DASA's) management information system (MIS), was to examine admissions into treatment with the intent of developing a procedure for grouping them into episodes. The second goal was to examine readmission to treatment after an index episode.

Our first goal, constructing episodes of treatment, is particularly important for the accurate evaluation of outcomes. The advantage of grouping admissions into episodes is that it allows us to recognize that a client might have several admissions to treatment in succession. In this case, outcomes must be considered as a result of the entire episode of treatment, not outcomes of each individual admission. If successive admissions are not recognized, then we run the risk of beginning to evaluate treatment before it is over.

An episode of treatment can capture the continuous nature of care that many clients receive. The characteristics of these continua might vary across clients. For some, continuous care is a sequence of treatment provided in varying degrees of intensity. Initially, when overcoming the initial phases of addiction is the primary focus, the intensity is typically quite high. Then, as the focus shifts to reintegrating the client into society, the intensity of treatment typically declines. For others, particularly those receiving primarily outpatient treatment, a continuum of care might vary little in intensity. Emphases might change as recovery progresses, but the intensity of publicly funded treatment contacts might remain steady.

Clinicians, researchers and government policy makers have long recognized the value in conceiving of treatment in terms of episodes (Institute of Medicine 1990), but episodes have received little attention in the research/evaluation literature. One reason for this is that identified data have not always been available on successive admissions to treatment, making construction of an episode impossible. In Washington State, however, DASA's MIS contains identified records of all admissions to and discharges from publicly funded chemical dependency treatment. This makes it possible to examine successive admissions and to develop a procedure for linking them together to construct episodes of treatment.

Our second goal, examining readmissions after an episode, is important for several reasons. First, such a study can provide a better understanding of patterns of treatment use over time. Knowing when and how often a client uses treatment services might help to improve the planning and delivery of those services. Second, it is valuable to identify the factors that either increase or decrease the chances of readmission. This knowledge might help in reducing the need for treatment after an episode, and thus reduce readmission rates.

At the outset, we want to note a distinction between readmission and relapse. Relapse refers to renewed substance use after a period of abstinence, while readmission refers to entering treatment after the end of an index episode. Not all relapses will result in readmissions to treatment, and, conversely, readmissions might not be the result of relapse, although some may argue that they suggest problems in a client's recovery. Analyses of both are desirable. However, in the present study, only readmissions are studied. This is because the present study relies exclusively on secondary data and there is no secondary data source available to us that focuses on relapse. Nonetheless, data obtained from an exclusive focus on treatment readmission in this study has the potential to contribute to the ongoing discussion regarding

the use of treatment services over time, and consequently, to contribute to current knowledge of treatment careers (Hser, Anglin, Grella, Longshore & Prendergrast 1997).

RESEARCH DESIGN

Data Sources

This study used three sources of data. The first was the Treatment and Assessment Report Generation Tool (TARGET), DASA's MIS. TARGET provides records of admissions to assessment, treatment, and detoxification services, as well as discharge records for all clients receiving publicly funded substance abuse services in Washington State. In addition, a wide variety of demographic data are available on each client. TARGET records from 1994 until the end of 1998 were the focus of analyses in the present study.

The second source of data was the Unemployment Insurance (UI) Wage file kept by Washington State's Employment Security Division (ESD). Every quarter, most employers are required by law to report the wages and hours worked of each of their employees to the ESD. We used UI data to identify those clients employed in the year before the start of their index episode, and used that variable in our statistical models.

Our final source of data was the Washington State Patrol's Criminal History Database, a file containing data on all arrests statewide for felonies and gross misdemeanors. Data in this file came from local police departments that are required by law to report all such events to the State Patrol. We used arrest data to identify clients arrested in the year before the start of their index episode and incorporated it as a variable in our statistical models.

Study Population

Our study population was all clients, between and including the ages of 18 and 64, who began and ended an episode of treatment in 1995. Episodes were categorized into two general types, those with a single admission and those with multiple admissions. For clients with a single admission, episodes began at the admission date and ended at discharge, or date of last contact. Multiple admissions made defining the beginning and end of an episode more complicated.

When clients had multiple admissions, the issue was whether they should be considered as part of the same episode. Based on an examination of admission and discharge records (See Appendix C), we found that subsequent admissions following a discharge had a very high probability of occurring within 30 days. For this reason, it was determined that if the length of time between discharge and a subsequent admission was 30 days or less, then both admissions were considered part of the same episode. If the subsequent admission occurred 31 days or more after the preceding discharge date, then that admission was considered part of a new episode.

We made a distinction between the types of clients DASA serves. One group includes only clients eligible for and funded through the ADATSA program. The Alcohol and Drug Abuse Treatment and Support Act (ADATSA), passed by the state legislature in 1988, provides assessment and treatment for severely addicted, indigent clients deemed unemployable because of their addiction. These are some of the most severely impaired clients that DASA serves. All began their search for treatment at a local Community Services Office, where

their eligibility for public funding is determined. Then, they were referred to an ADATSA assessment center, where their clinical eligibility and addiction severity was determined. If clients were determined to be eligible for public funding, severely addicted, unemployable, and judged to be amenable to treatment, they were eligible for ADATSA-funded treatment. Once determined eligible**,** a treatment plan was constructed to suit their particular needs (for more details on the operations of the ADATSA program see Longhi et al. 1991). Most clients in Washington State receiving inpatient treatment were funded through the ADATSA program.

Another group of clients entered treatment without such severe deficits. For them, the primary mode of treatment was typically outpatient. For this group, there was no centralized system of assessment and admission: clients sought treatment directly with a local treatment provider. In this report, we refer to these people simply as non-ADATSA clients.

Two types of clients were deleted from our analyses: those who died after the completion of their episode and those who received opiate substitution treatment. Because of the nature of opiate addiction and the unique treatment for it, the use of treatment services for opiate substitution clients should be examined separately.

Analyses: Proportional Hazards Regression

Our data told us two things about readmissions: first, if they occurred and second, when they occurred relative to the end of a treatment episode. Both pieces of information were important, and to analyze data like these, it is appropriate to use survival analysis techniques. These are a general class of statistical methods designed to study the occurrence and timing of events, the event in our case being readmission to treatment. For this report, we used one particular survival analysis technique, proportional hazards regression, to examine readmissions and the factors associated with them.
To better understand the analyses that follow, it is useful to understand our dependent variable, or what we are trying to explain. The dependent variable in a proportional hazards model is the hazard for an event, defined as the risk that an event will occur at a particular time. The terms hazard and risk have been used interchangeably, and since risk is the common term, we will use it here.

Allison (1995) suggests that we think of risks as characteristics of individuals, not populations or samples, and that each individual may have risks that are completely different from those of anyone else. For example, at any given time, we all have risks for various events, like accidental death, contacting influenza, or, on a more optimistic note, receiving a salary increase. In our data on readmissions, time is measured in weeks, and we want to know whether various factors (age, gender, completing treatment, etc.) have effects on the risk in a given week.

ORGANIZATION OF THIS REPORT

We will present data and the results of analyses that address the following four questions:

1. What were some of the characteristics of the treatment episodes that ended in 1995? Did these characteristics differ by program type (ADATSA, Non-ADATSA)?

2. What were some of the characteristics of clients beginning and ending an episode of treatment in 1995?

3. What percent of clients were readmitted in each of the three years following the end of a treatment episode?

4. In the year following the end of the index episode, what factors had statistically significant associations with readmission?

QUESTIONS AND FINDINGS

Question 1: What were some of the characteristics of the treatment episodes that ended in 1995? Did those characteristics differ by program type (ADATSA, Non-ADATSA)?

Table 1: Characteristics of Treatment Episodes Beginning and Ending in 1995.

CHARACTERISTIC	PROGRAM		
	ADATSA	NON-ADATSA	TOTAL
NUMBER OF EPISODES ENDING IN 95	5167	6215	11382
EPISODES INVOLVING ONE ADMISSION			
1. PERCENT OF TOTAL PROGRAM EPISODES	50%	96%	
2. FREQ. OF INPATIENT EPISODES	1914	719	2633
3. PERCENT OF INPATIENT EPISODES COMPLETED	49%	48%	49%
4. FREQ. OF OUTPATIENT EPISODES	682	5223	5905
5. PERCENT OF OUTPATIENT EPISODES COMPLETED	**39%**	**10%**	**14%**
EPISODES INVOLVING MORE THAN ONE ADMISSION			
1. PERCENT OF TOTAL PROGRAM EPISODES	50%	4%	
2. FREQ. W/AN INPATIENT ADMISSION	2498	125	2623
3. FREQ. W/AN INPATIENT COMPLETION	2272	74	2346
4. PERCENT OF EPISODES W/AT LEAST ONE COMPLETION	**91%**	**52%**	**87%**
5. FREQ. WHERE THE LAST MODALITY WAS COMPLETED	918	51	969
6. PERCENT OF EPISODES WHERE LAST ADMISSION COMPLETED	**36%**	**19%**	**34%**

MAIN POINTS

- ADATSA clients were more likely to have episodes involving more than one admission to treatment (50% v. 4%)*

- For episodes involving one admission: Both ADATSA and Non-ADATSA clients had the same completion rate if admitted to inpatient treatment. However, if admitted to outpatient treatment, ADATSA clients, when compared to Non-ADATSA clients, were much more likely to complete it (39% v. 10%)*.

- For episodes with more than one admission, ADATSA clients, when compared to Non-ADATSA clients, were much more likely to have at least one completion (91% v. 52%), and much more likely to complete the final admission (36% v. 19%)*.

*differences are statistically significant (p<.001)

Question 2: What were some of the characteristics of clients ending an episode in 1995?

Table 2: Characteristics of Clients Ending an Episode of Treatment in 1995 by Program
Type.

	PROGRAM		
	ADATSA (N=5260)	Non-ADATSA (N=5024)	Total (N=10284)
Gender (% female)	32%	43%	38%
Race			
White	72%	69%	70%
Black	15%	11%	13%
Native American	8%	8%	8%
Hispanic	4%	9%	7%
Other	1%	2%	2%
Age	32	32	32
Education (% > 12 yrs)	16%	19%	17%
Primary Drug			
Alcohol	53%	62%	57%
Marijuana	9%	11%	10%
Amphetamines	14%	8%	11%
Heroin/Cocaine	23%	16%	20%
Other	1%	3%	2%
Living Arrangement			
Alone	34%	23%	29%
With family	48%	64%	56%
With friends	18%	12%	15%
Unknown	<1%	<1%	<1%
Current Mental Health Problem			
Treated in the Prior Year	23%	14%	19%

Note: Chi-Square tests show significant differences (p<.001) between groups for all variables except age.

MAIN POINTS

- There were important differences in the primary drug of clients. ADATSA clients are more likely to use heroin and cocaine (23% v. 16%), and less likely to use alcohol (53% v. 62%), when compared to Non-ADATSA clients.

- The living arrangements of non-ADATSA clients were more conducive to recovery when compared to ADATSA clients: more live with family (64% v. 48%), fewer live alone (23% v. 34%).

- There were important gender differences in the programs: the percentage of females is higher among non-ADATSA clients (43%) than among those in ADATSA (32%).

- ADATSA clients were more likely than non-ADATSA clients to have received treatment in the year prior to their 1995 episode (23% v. 14%).

Question 3: What percent of clients were readmitted in each of the three years following their index treatment episode?

Table 3: Percent of Clients Who Began and Ended a Treatment Episode in 1995 that Were Readmitted in Each of the Subsequent Three Years, by Modality of Readmission.

	PROGRAM								
	ADATSA (N=5260)			Non-ADATSA (N=5024)			Total (N=10284)		
	1st Year	2nd Year	3rd Year	1st Year	2nd Year	3rd Year	1st Year	2nd Year	3rd Year
Inpatient	10%	8%	7%	6%	5%	5%	8%	6%	6%
Outpatient	18%	11%	7%	16%	9%	6%	17%	10%	7%
No Readmissions	73%	81%	85%	79%	86%	90%	76%	83%	88%

MAIN POINTS

- Overall, 76% of clients did not return for additional treatment in the first year, and that figure rises to 88 % by the third year.

- Overall, most clients who were readmitted entered outpatient rather than inpatient treatment (17% v. 8% in the first year)*.   In addition, readmissions to outpatient treatment declined in each successive year, (17% in the first year, 10 % in second and 7% in the third)*.

- Only a small group of clients returned for inpatient treatment, regardless of their program type. Overall, 8% returned to inpatient in the first year and 6% in the second and third years.

* differences are statistically significant (p<.001)

Question 4: In the year following the end of an episode, what factors were associated with readmission?

Table 4: Results of Proportional Hazards Regression Predicting Readmission to Treatment (inpatient or outpatient) clients in the Year Following the End of a Treatment Episode in 1995.

Independent Variables	Effect on the Risk of Readmission (negative numbers reflect decreasing risk, positive numbers reflect increasing risk)	
	ADATSA (N=5260)	Non-ADATSA (N=5024)
Treatment Variables		
Completed 1995 Episode	-20%	-35%
Had Inpatient Treatment only in their 1995 Episode (compared to outpatient only)	+28%	+31%
Had Treatment prior to the Index Episode	+34%	+69%
Client Characteristics		
Female	+43%	+36%
Arrested in the Year Prior to Treatment	+26%	+48%
Had a Current Mental Health Problem	N.S.	+20%
Uses Amphetamines/Methamphetamines Primarily (compared to alcohol)	-26%	N.S.
Uses Heroin/Cocaine Primarily (compared to alcohol)	-19%	N.S.

(Note: all coefficients are statistically significant to the 0.05 level.)

FINDINGS

Client Similarities

- For both ADATSA and Non-ADATSA clients, three factors had significant effects on readmission:

- Completing an episode of treatment reduced the risk of readmission, 19% for ADATSA clients and 37% for Non-ADATSA.

- Females had a higher risk of readmission, 43% for ADATSA clients and 34% for Non-ADATSA.

- Being arrested in the year before treatment increased the risk of readmission, 26% for ADATSA clients and 45% for Non-ADATSA.

Client Differences

- For ADATSA clients, those who use amphetamines/methamphetamines primarily and those using heroin/cocaine primarily had a lower risk of readmission (22% and 19%

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respectively), when compared to those using alcohol. No such differences were found for Non-ADATSA clients.

- For Non-ADATSA clients, having a current mental health problem significantly increased the risk of readmission, but that finding did not hold for ADATSA clients.

Note: there were many factors that we analyzed that were not significantly related to readmission, such as the length of the index treatment episode, age, race, and marital status. This was the case for both ADATSA and Non-ADATSA clients.

DISCUSSION

This study had two goals: to organize treatment admissions into episodes and then to examine readmissions after an index episode. For each client, the last episode beginning and ending in 1995 was chosen as the index. Clients were categorized as ADATSA or Non-ADATSA, based on the determinations made in 1995.

Findings Regarding Episodes

For ADATSA clients, the index episodes in 1995 were different in several respects when compared to Non-ADATSA clients. ADATSA episodes are more likely to involve both inpatient treatment and multiple admissions consisting of different modalities of treatment. Also, ADATSA clients were more likely to complete an episode, regardless of the number of admissions or modalities involved. One explanation for this finding is that ADATSA clients received a stipend while in outpatient treatment, and the stipend ended if treatment was aborted. The stipend might have provided the additional motivation necessary for clients to remain in treatment.

Findings Regarding Readmission

While public perception posits a revolving door, with clients coming continually in and out of treatment, our data shows that this was not the case for the majority of DASA clients. Because studies of long-term treatment use are rare, particularly for clients receiving publicly funded treatment; we do not have a good comparative reference. But overall, 76% of clients did not return to treatment in the first year following an episode, and that figure increases to 88% in the third year. Thus, only a small proportion of clients who completed an episode in 1995 received treatment again in the ensuing years. ADATSA clients were more likely than Non-ADATSA clients to return to treatment, but given their greater severity this difference is not surprising. The percent of clients experiencing readmission was somewhat lower than was found in other studies (Booth et al. 1991), but sample differences might account for that.

The most prominent finding of this study is that clients who completed the index episode of treatment had significantly lower risks of being readmitted when compared to those who did not complete that episode. This finding held for both ADATSA and Non-ADATSA clients. The policy implication of this finding is that if successful efforts could be made to keep clients in treatment until completion, the rate of readmission could fall below a level that is already rather low.

In addition to completion, the content of the index episode, in terms of modalities or combinations of modalities, was associated with significant changes in the risk of readmission. Clients who had inpatient treatment only had higher risks of readmissions than those who had outpatient only. This was true for both ADATSA and Non-ADATSA clients. There are several possible explanations for this. It might be that to alleviate the need for additional treatment a client must deal with both addiction and becoming reintegrated into society. For some clients, inpatient treatment alone might not be sufficient to accomplish both of these goals. Another possible explanation focuses on client severity. It could be that those who receive inpatient treatment had more severe problems than those that did not, and that for such clients inpatient treatment alone is not sufficient. We had several proxy measures for severity, such as employment and arrest histories, frequency of substance use

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and age at first use, but nothing quite as precise as a comprehensive severity measure. The Addiction Severity Index will be soon be incorporated into TARGET, and those measures will help in future research.

As expected for ADATSA clients, those with mixed episodes, having both inpatient and outpatient admissions, had lower risks of readmission than those receiving outpatient treatment only. For those clients, a more complete continuum of care seems to have been beneficial. However, this was not the case for Non-ADATSA clients, but only about 1% of those clients had mixed episodes. Thus, the number of clients receiving such treatment was probably not sufficient to detect statistically significant differences.

One of the more consistent findings of outcome research is that the length of treatment is associated with better outcomes (Hubbard et al. 1997; Swindle et al. 1995; Moos et al. 1995). We found something slightly different. While longer time in treatment was associated with a reduced risk of readmission, when we included modalities in our statistical models, length ceased to be a significant predictor. There is a degree of correlation between these two variables, but when considered together whether a client had inpatient, outpatient or a combination of both proved to be a stronger predictor than length alone.

Women were at greater risk of readmission than were men. This holds true whether they were ADATSA or non-ADATSA-funded. The reason for this finding is not completely clear. Humphreys et al. (1997) made a similar finding, and suggested that two things might be at work. First, women might have better relationships with friends and family, which could influence their decision to seek additional treatment. Second, women who continue with their substance abuse might experience greater social stigma than men. Higher readmission rates among women might also reflect differences in help-seeking behavior (Jordan and Oei 1989). Washington State policy might also play a role, as pregnant women are given priority for entry into treatment.

Those arrested in the year before treatment also had higher rates of readmission. This could be due to the increased scrutiny that they experienced. After arrest, many arrestees are placed on probation or parole, where their behavior is monitored on a regular basis. If problems with addiction persisted, parole or probation officers might have convinced clients to return for additional treatment.

Limitations and Future Research

There are several limitations to this study. First, better data on the conditions of clients at readmission would be helpful. For example, with the data we have, there is no way to distinguish between readmissions due to relapse, or readmissions that would more aptly be considered aftercare. Another limitation was that among those ending an episode, we do not know the number of clients in need of further treatment in the follow-up period. This fact makes our readmission rates difficult to interpret: clients not readmitted could be in successful recovery or they could be in need of further treatment but not receiving it.

Future research could incorporate additional data to predict readmission. In this report, all factors used to predict readmission were measured at the start of the episode in 1995. Many of these factors are invariant; they do not change through time. However, factors such as employment status and criminal justice involvement do vary, and that variation might be

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associated with readmission. Proportional hazards regression allows us to incorporate covariance that vary through time. Thus, data on employment and arrests in the follow-up period can and should be incorporated into future analyses. Time varying covariance would allow us to examine the relationship between what is happening in a client's life after treatment, such as patterns of employment, and readmission. The hypotheses would be that active employment following treatment would decrease the risk of readmission, while arrests following treatment would increase the risk.

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APPENDICIES

APPENDIX A: Documentation

Several critical decisions were made in the performance of this study. They include:

1. **Identifying ADATSA clients**: Our assumption was that there might be important differences in clients that influence how much treatment they use. These differences might involve severity of addiction, access to treatment and the impact of addiction on employability. These factors are difficult to measure, but whether or not a clients was ever deemed eligible for ADATSA can serve as a proxy for a severely addicted, unemployable client. For this reason, much of our analysis distinguished ADATSA from non-ADATSA clients.

2. **Identifying ADATSA episodes:** In episodes with multiple admissions, one admission might be ADATSA while the other(s) might not. For this study, if any admission in an episode had ADATSA as its contract type, that episode was considered an ADATSA episode.

3. **Correcting Embedded Spans:** Embedded spans occur when the admission and discharge dates occur within a larger span of treatment. For example, a client might have been admitted on 4/1/99 and discharged 7/1/99. However, they might also have been admitted on 5/1/99 and discharged on 6/1/99. This second set of dates is inside the range of dates of the first admission. Obviously, clients can't be in the two places at the same time, so we constructed decision rules to make sense of these situations. These rules were based on two assumptions: first, data regarding inpatient treatment is more reliable than that of outpatient, and second, for outpatient treatment, admission dates are more reliable than discharge dates. The following problems were evident, and solutions are given.

    a. An inpatient span inside another inpatient span: the 'inside' span was eliminated. (10 cases)
    b. An outpatient span inside an inpatient span: the outpatient (inside) span was eliminated. (91 cases)
    c. An inpatient span inside an outpatient span: this can happen when a client enters outpatient while waiting for an inpatient bed. We created 3 admissions from these two, assuming that there was one span of outpatient treatment before inpatient, and one span after (468 cases).
    d. An outpatient span inside another outpatient span: the 'inside' span was deleted (141 cases).

4. **Correcting Overlapping Spans:** These occur when, for a single client, one admission date is before another discharge date. Again, this implies that the same client is being treated at two places simultaneously. Our corrections involved changing admission or discharge dates, depending on the situation.

    a. If an inpatient admission overlaps an inpatient discharge, then the overlapped discharge date was changed to equal the overlapping admission date (n=17).

    b. If an outpatient admission overlaps an outpatient discharge, then the overlapped discharge date was changed to equal the overlapping admission date (n=90).

    c. If an inpatient admission overlaps an outpatient discharge, then the outpatient discharge date was changed to equal the inpatient admission date (n=436).

    d. If an outpatient admission overlaps an inpatient discharge, then the outpatient admission date was changed to equal the inpatient discharge date (n=15).

5. Only clients between and including the ages of 18 to 64 are included in these analyses.

6. 1425 clients died after the end of their last episode in 1995. These clients were removed from the analyses.

7. Clients receiving opiate substitution treatment in 1994 and 1995 were not included in the analyses. Their particular addiction makes them different in many ways from other types of clients.

APPENDIX B: Statistical Models

Table B1: Results from Proportional Hazards Regression for ADATSA clients Predicting the Hazard for Readmission in the Year Following the End of a Treatment Episode (N=5260).

Independent Variable	Parameter Estimate	P-value	Risk Ratio
Treatment Variables			
Completed 1995 Episode	-0.219497	0.0006	0.803
Inpatient Treatment only In 1995 Episode (compared to outpatient only)	0.249554	0.0014	1.283
Inpatient & Outpatient in 1995 Episode (compared to outpatient only)	-0.166655	0.0521	0.846
Treated Prior to the 1995 Episode	0.294290	0.0001	1.342
Client Characteristics			
Age	0.001418	0.9152	1.000
Male	-0.565486	0.0001	0.568
Race (1=white, 0=non-white)	0.069395	0.3060	1.072
Married	0.102286	0.3233	1.108
Employed in the Year Before the Episode	-0.061480	0.3122	0.940
Mental Health Problem	0.121383	0.2212	1.129
Arrested in the Year Before the Episode	0.234558	0.0001	1.264
Primary Drug (compared to alcohol)			
Marijuana	-0.203966	0.0854	0.815
Amphetamines/ Methamphetamines	-0.298409	0.0029	0.742
Heroin/Cocaine	-0.215647	0.0036	0.806
Other	0.266056	0.2336	1.305

Model Chi-Square (Wald): 197.794 with 15 degrees of freedom (p=0.0001)

Table B2: Results from Proportional Hazards Regression for Non-ADATSA clients
Predicting the Hazard for Readmission in the Year Following the End of a
Treatment Episode (N=5024).

Independent Variable	Parameter Estimate	P-value	Risk Ratio
Treatment Variables			
Completed 1995 Episode	-0.433765	0.0001	0.648
Inpatient Treatment only In 1995 Episode (compared to outpatient only)	0.272058	0.0102	1.313
Inpatient & Outpatient In 1995 Episode (compared to outpatient only)	0.458084	0.0803	1.581
Treated Prior to the 1995 Episode	0.528443	0.0001	1.696
Client Characteristics			
Age	0.007363	0.0587	1.007
Male	-0.449356	0.0001	0.638
Race (1=white, 0=non-white)	0.036147	0.6230	1.027
Married	0.022073	0.8063	1.022
Employed in the Year Before the Episode	0.062340	0.3531	1.064
Mental Health Problem	0.182447	0.0288	1.200
Arrested in the Year Before the Episode	0.390072	0.0001	1.477
Primary Drug (compared to alcohol)			
Marijuana	-0.147764	0.2076	0.863
Amphetamines/ Methamphetamines	-0.082558	0.5091	0.921
Heroin/Cocaine	-0.099775	0.2741	0.905
Other	-0.118786	0.6037	0.888

Model Chi-Square (Wald): 160.257 with 16 degrees of freedom (p=0.0001)

APPENDIX C: Constructing Treatment Episodes

Our goal in constructing treatment episodes was to use administrative data to link, or group, individual admissions to treatment into a series that reflected continuous care for addiction. Episodes are necessary for the accurate evaluation of outcomes: without them, it is difficult to know when treatment begins and ends, and thus, when outcomes should be tracked. Determining whether successive admissions to treatment reflected continuous, as opposed to interrupted care was the challenge, and a general rule had to be developed that would guide us in making that determination. Given the number of clients in our study population, constructing episodes on a case by case basis was impossible.

The results of this study hinged on our definition of treatment episodes. In our multivariate analyses, the dependent variable was readmission to treatment. A readmission was conceived of as a return to treatment that marked the beginning of a new episode. Thus, this new episode had to be distinguished from continuous care. The key in assessing the continuity of care for addiction is the amount of time that elapses between discharge from one modality and admission to another. Continuing care does not necessarily mean discharge one day and readmission the next. Many factors, including client choice or treatment availability, might make such a result impossible. But clearly, if one year elapsed between a discharge from treatment and the next admission, we would consider such a case an example of interrupted care. However, when the length of time between discharge and admission grows smaller, it becomes more difficult to determine whether care was continuous or interrupted. To guide our decision-making process, we examined data from a previous, unpublished study of ADATSA clients that contained treatment records from 1994 through 1997.

We organized that data to tell us when clients returned for additional treatment, relative to the most recent discharge. In addition, we identified the modality clients left and the subsequent modality clients were admitted to. If clients experienced readmission, four possible paths were taken: from inpatient to outpatient, outpatient to outpatient, inpatient to inpatient, and outpatient to outpatient. Data on each of those paths is presented in the following four tables. Clients were divided into those completing the initial admission and those who did not. Readmissions were also grouped by the length of time from discharge of the initial admission to the admission date of the latter admission.

One fact should be noted: the following tables contain data for only those clients that experienced readmission. Many were admitted only once, and are thus not represented in these tables.

TABLE C1: Inpatient to Outpatient Readmission Data: The Number of Days between Discharge from Inpatient Treatment and a Subsequent Admission to Outpatient Treatment, by Discharge Type.

	DISCHARGE TYPE			
	COMPLETE (**N=3357**)		NOT COMPLETE (**N=4339**)	
Number of Days	Percent	Cumulative Percent	Percent	Cumulative Percent
Negative	1.4%	1.4%	1.7%	1.7%
0-7	**65.7%**	**67.1%**	**54.6%**	**56.3%**
8-14	14.2%	81.3%	13.6%	69.9%
15-29	**7.9%**	**89.2%**	**10.3%**	**80.2%**
30-60	3.9%	93.1%	5.8%	86.0%
61-90	2.7%	95.8%	3.3%	89.3%
91-120	0.7%	96.5%	1.5%	90.8%
121-180	0.7%	97.2%	2.1%	92.9%
181-365	1.1%	98.3%	2.9%	95.8%
1+ Yrs.	1.6%	99.9%	4.3%	100.1%

TABLE C2: Outpatient to Outpatient Readmission Data: The Number of Days Between Discharge from Outpatient Treatment to a Subsequent Admission to Outpatient Treatment, by Discharge Type.

	DISCHARGE TYPE			
Number of Days	COMPLETE (N=944)		NOT COMPLETE (N=2278)	
	Percent	Cumulative Percent	Percent	Cumulative Percent
Negative	3.7%	3.7%	3.5%	3.5%
0-7	36.8%	40.5%	21.6%	25.1%
8-14	11.1%	51.6%	8.2%	33.3%
15-29	11.0%	62.6%	8.1%	41.4%
30-60	9.7%	72.3%	11.2%	52.6%
61-90	5.9%	78.2%	7.5%	60.1%
91-120	4.6%	82.8%	5.2%	65.3%
121-180	4.1%	86.9%	8.0%	73.3%
181-365	6.1%	93.0%	21.9%	95.2%
1+ Yrs.	7.0%	100.0%	4.8%	100.0%

Table C3: Inpatient to Inpatient Readmission Data: Days Between Discharge from Inpatient Treatment and Subsequent Admission to Inpatient Treatment, by Discharge Type

| | DISCHARGE TYPE | | | |
| | COMPLETE (N=2102) | | NOT COMPLETE (N=1015) | |
Number of Days	Percent	Cumulative Percent	Percent	Cumulative Percent
Negative	0.5%	0.5%	0.9%	0.9%
0-7	**64%**	**64.5%**	**63.8%**	**64.7%**
8-14	3.9%	68.4%	4.2%	68.9%
15-29	**4.6%**	**73.0%**	**5.9%**	**74.8%**
30-60	5.0%	78.0%	4.3%	79.1%
61-90	2.6%	80.6%	3.3%	82.4%
91-120	1.6%	82.2%	1.6%	84.0%
121-180	2.9%	85.1%	2.1%	86.1%
181-365	5.8%	90.9%	5.3%	91.4%
1+ Yrs.	9.1%	100.0%	8.7%	100.0%

TABLE C4: Outpatient to Inpatient Readmission Data: The Number of Days Between Discharge from Outpatient Treatment and Subsequent Admission to Inpatient Treatment, by Discharge Type.

| | DISCHARGE TYPE | | | |
| | COMPLETE (N=2376) | | NOT COMPLETE (N=756) | |
Number of Days	Percent	Cumulative Percent	Percent	Cumulative Percent
Negative	16.0%	16.0%	14.9%	14.9%
0-7	**27.4%**	**43.4%**	**21.2%**	**36.1%**
8-14	5.6%	49.0%	6.7%	42.8%
15-29	**4.8%**	**53.8%**	**6.6%**	**49.4%**
30-60	6.4%	60.2%	6.0%	55.4%
61-90	5.0%	65.2%	6.2%	61.6%
91-120	4.2%	69.4%	3.7%	65.3%
121-180	6.0%	75.4%	6.0%	71.3%
181-365	9.7%	85.1%	11.0%	82.3%
1+ Yrs.	14.9%	100.0%	17.7%	100.0%

Results

In each table, two rows have been highlighted. The first row shows the percent of clients returning in zero to 7 days and second shows those returning in 15 to 29 days. These rows illustrate several things.

- More people were readmitted between zero and seven days after discharge than in any other time span, with the one exception being non-completers moving from outpatient to outpatient (table c2). In tables C1 and C3, the majority of clients returned within that span of time.

- In nearly all cases, the majority of clients were readmitted in less than 30 days. (the exceptions were non-completers in tables C2 and C4). Thus, if clients returned for additional treatment, most did so in a short period of time.

- After 30 days, typically only very small proportions of clients are readmitted in any one time span, even though those spans become longer as we move farther from the discharge date.

Our Decision

These data show that readmissions were not randomly distributed across time. Rather, for those readmitted, their readmission dates tended to be clustered near their discharge dates. Based on this data, we felt that readmission within 30 days reflected continuing care for addiction. If the time between discharge and readmission exceeded 30 days, then the probability of serious problems with recovery increases. Thus, treatment at the subsequent admission would most likely represent the start of a new episode. Our thirty-day cut-off makes intuitive sense for two reasons. First, there are often waiting lists to get into treatment, so we would not necessarily expect that a discharge would be followed immediately by readmission. Second, it takes time to make arrangements for a readmission to treatment. In many cases a discharged client had to contact a new provider, establish financial eligibility, then be assessed by that provider. For these reasons, we established a rule that two admissions to treatment would be linked into an episode if 30 or fewer days elapsed between discharge and the subsequent readmission. Conversely, if more than 30 days elapsed, the admissions were considered part of separate episodes.

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