

NEDS ANALYTIC SUMMARY

Highlights

Why use case-mix adjustment methods?

- Treatment providers serve clients who may have very different characteristics than those served by other providers.
- Those client characteristics, such as severity of addiction, employment status, and level of social functioning, may affect client treatment outcomes.
- Case-mix adjustment is a tool that allows fair comparisons to be made between outcomes achieved by treatment providers by taking those types of characteristics into account.



Using Case-Mix Adjustment Methods to Measure the Effectiveness of Substance Abuse Treatment



NEDS Analytic Summary Series

The Center for Substance Abuse Treatment (CSAT) works to improve the lives of those affected by alcohol and other substance abuse, and through treatment, to reduce the ill effects of substance abuse on individuals, families, communities and society-at-large. Thus, one important CSAT mission is to expand the knowledge about effective substance abuse treatment and recovery services. In support of these efforts, CSAT established the National Evaluation and Data Services (NEDS) contract to provide a wide array of secondary data analysis products to the substance abuse treatment field.

Specifically, the NEDS contract focuses on providing CSAT with analytic capability to use existing data to address policy and practice-relevant topics as well as future analysis and evaluation activities. NEDS has developed several product lines designed to provide analytic findings for substance abuse treatment policy makers, service providers, services researchers and evaluators in a format that is most useful to the end user.

The Analytic Summary is one of the NEDS product lines. The purpose of the Analytic Summary is to provide a brief summary of each technical report produced by NEDS, written in non-technical language. Readers who find the Analytic Summary results of interest can contact the original NEDS technical report authors for more detailed information. Through this process, the NEDS Analytic Summaries provide information to the substance abuse treatment field and promote linkages among different areas in the field.

This Analytic Summary

This NEDS Analytic Summary is based on the NEDS Technical Report entitled *Using Case-Mix Adjustment Methods to Measure the Effectiveness of Substance Abuse Treatment: Three Examples Using Client Employment Outcomes* (Koenig, L., Fields, E.L., Dall, T.M., Ameen, A.Z., and Harwood, H.J., March 2000). For a more thorough discussion of the analysis and findings, please obtain a copy of the complete Technical Report. Information for doing so is provided on the last page of this summary.

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Using Case-Mix Adjustment Methods to Measure the Effectiveness of Substance Abuse Treatment

- Substance abuse treatment funders want to identify the most cost-effective health care approaches and providers.
- Case-mix adjustment methods account for the fact that providers treat clients who have differing degrees of severity and will, potentially, have different levels of success.



Analytic Importance

One important function of CSAT is to expand the knowledge about and the availability of effective treatment and recovery services for those affected by alcohol and other substance abuse. In sponsoring these secondary analyses, CSAT is attempting to gain useful insight into the fundamental questions: *What actually constitutes effective (and cost-effective) treatment, and for what populations?* This report demonstrates some of the case-mix adjustment methods available to assess the relative effectiveness of substance abuse treatment providers.

Analytic Purpose

Given an increasing emphasis on providing affordable health care, the Federal Government, states, and managed care companies all want to increase efforts to identify the most cost-effective health care providers. This is particularly true in the area of substance abuse treatment. Faced with having to improve outcomes with fewer resources—to “do more with less and do it better”—substance abuse treatment providers also acknowledge the need to evaluate and monitor their programs.

This summary discusses some of the potential challenges of measuring the effectiveness of substance abuse treatment across providers while recognizing that there are differences in the characteristics of clients in their care. The original analysis attempted to determine how to evaluate the effectiveness of different treatment providers in a way that allows comparisons to be as fair and accurate as possible. It also demonstrated some of the available

techniques and methods for undertaking this type of analysis.

Case-mix adjustment (CMA) is one tool for making comparisons and arriving at valid conclusions. “Case mix” refers to the characteristics of cases served by a health service provider, where some clients are at greater risk of having less successful treatment outcomes than others. Such characteristics could include, for example:

- Severity of addiction
- Employment status
- Level of social functioning.

Substance abuse treatment providers often serve clients who differ dramatically along these factors. Providers also frequently specialize in treating client sub-populations who are disproportionately impaired by poverty and other disabling factors. Two given providers may offer substance abuse treatment services of equal effectiveness, but if one provider is treating clients who are severely addicted and the second provider is treating clients who are less addicted, the client outcomes could understandably be different. Any attempt to measure the effectiveness of treatment services or of different treatment settings using client outcomes across different providers must account for differences in clients who are in treatment. This helps assure the validity of the findings.

Analytic Approach

Data from 1,064 clients receiving outpatient treatment from 24 different providers were used to compare provider effectiveness. This informa-

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- This analysis focused on an interview question asking the “number of days clients were paid for work in the past 30 days.”
- Providers were ranked along one dimension—ability to improve the employability of clients.

tion was supplied from prior work by the non-profit Treatment Research Institute (TRI) in collaboration with researchers at the University of Pennsylvania and the Veterans Administration. Client data were collected using the Addiction Severity Index (ASI), a standardized clinical analysis interview guide that assesses problem severity in six areas commonly affected by substance abuse and problems with mental health. Questions cover a broad range of problems that are supposed to be affected by substance abuse treatment (drug use/alcohol use, medical, employment, legal, family, and psychiatric functioning). The current edition of the ASI also includes items that measure family influences, abuse relationships, levels of social support and psychiatric disorders.

The analysis focused on an interview question asking for the number of days clients were paid for work in the past 30 days, and it was asked at intake and again during follow-up interviews. Three regression techniques (ordinary least squares, logistic, and ordered logistic models) were used to rank providers along a single dimension: the ability to improve the employability of clients. Seventeen providers were ranked based on their estimated effectiveness relative to that of the median ranked provider.

The initial sample numbered 1,440 clients who completed both an intake and follow-up interview, but some were excluded because they had been in a controlled environment (jail or inpatient drug treatment) before the follow-up interview. This made it possible to ensure consistency across all of the providers in the analysis. Clients whose data had missing values for any

of the control variables were also omitted from the sample. For this analysis, researchers chose to analyze the effectiveness of providers serving outpatient clients rather than those treating clients in inpatient or methadone treatment facilities.

Eight providers that had fewer than 15 clients each were combined into a single entity. This was because the number of clients in each of these provider settings was not large enough to measure their effectiveness accurately. Ultimately, this analysis covered 17 providers, 16 with 15 or more clients plus the composite provider.

Several other outcome variables could have been used, but the chosen employment outcome measure was both similar to other variables often used in substance abuse analysis, and allowed researchers some flexibility. This choice made it possible to study the importance of case mix when making comparisons, and to demonstrate a few of the techniques that can be used when undertaking case-mix analysis. The 1,064 clients in the final analysis had the following characteristics:

- Demographically, the population was largely male (63%), unmarried (81%), African American (65%), with an average age of 36 years.
- The total sample averaged 11.6 years of education.
- The average number of days the clients were employed 30 days prior to intake was 6.4 days, and the average prior to follow-up was 8.5 days.

The majority believed counseling for employment problems was not impor-



Using Case-Mix Adjustment Methods to Measure the Effectiveness of Substance Abuse Treatment (cont.)

tant (56%), a small percentage (10%) believed counseling was slightly or moderately important, and a significant minority believed it was extremely or considerably important (33%). These data are summarized in Exhibit 1.

Three questions guided the analysis:

- How does using case-mix adjustment methods affect estimates of provider treatment effectiveness when examining employment outcomes?
- Do estimates of provider effectiveness depend on how client employment outcomes are measured?
- Do the three regression models identify different sets of outliers (or those providers more or less effective than the “average” provider)? If so, in what ways do the set of outliers change?

The models used in this analysis included basic demographic characteristics (gender, age, marital status, education, race, and ethnicity). These demographic variables were included because labor force participation differs among individuals with different demographic characteristics. For example, married women, particularly women with children, are more likely not to work outside the home than men or single women. In addition, different groups may show different abilities to find work as well as differences in the desire to obtain full or part-time work. These demographics, in addition to client severity at intake in several areas (substance abuse, social functioning, etc.), and a measure of the importance of counseling for employment problems were control variables for the analysis.

Findings

By using a narrowly focused outcome measure and applying three

The questions guiding this analysis were:

- How does using case-mix adjustment methods affect estimates of provider treatment effectiveness when examining employment outcomes?
- Do estimates of provider effectiveness depend on how client employment outcomes are measured?
- Do the three regression models yield different results? If so, in what ways do the results differ?



Exhibit 1
Profile of Clients in Sample for Case-Mix Adjustment Analysis

CLIENT CHARACTERISTICS	PERCENT/MEAN
Gender	
▪ Male	63%
▪ Female	37%
Age (average)	36 years
Race/ethnicity	
▪ African American	65%
▪ White, non-Hispanic	35%
▪ Hispanic	6%
Marital Status (not married)	81%
Number of days worked prior to intake (average)	6.4 days
Number of days worked prior to follow-up (average)	8.5 days
Employment Counseling	
▪ Extremely important	33%
▪ Moderately important	10%
▪ Not important	56%

Using Case-Mix Adjustment Methods to Measure the Effectiveness of Substance Abuse Treatment (cont.)

Findings from this analysis are summarized below:

- Client case mix “matters” in determining provider effectiveness.
- Clients with higher levels of education showed more improvement in employment after treatment.
- Women showed more improvement than men in their employment status following treatment.
- Clients who said at intake that employment counseling is “important” showed more improvement than those who said it was “not important.”



regression models to that measure, researchers found that *case mix matters* in determining provider effectiveness. This analysis produced very different rankings among providers between a case-mix model and an unadjusted model. Several providers were identified as “outliers” (performing either at a statistically significant level above or below the median-ranked provider) after adjusting for client demographics and severity of presenting symptoms.

Other results of the regression analysis include:

- Clients with higher levels of education consistently showed more improvements in employment than those with less education.
- Women showed more improvement than men in their employment status following treatment.
- Clients who had less severe medical problems showed less improvement in employment status than those with severe medical problems.
- Clients who said at intake that employment counseling is important or very important showed more improvement than those who said it was not important or only moderately important.
- Married clients showed more and African American clients showed less improvement in employment status.

Age, though negatively correlated with improvements in employment status, had only a moderate effect in the analysis and findings were not statistically significant. Being Hispanic, having

more severe drug, family, legal, or alcohol problems at intake, and a higher severity of psychiatric problems at intake did not prove statistically significant in terms of employment status in this analysis. On average, though, clients who came to treatment with more severe drug problems showed less improvement in their employment situation than those with less severe drug problems at intake, but results were not statistically significant across any of the three models.

Provider rankings were consistent across the three case-mix adjusted models. The results, however, also showed that the ordinary least squares and ordered logistic models appear able to detect differences between providers that did not appear from the results of the logistic regression model. This is perhaps not surprising because the first two took into account more information on the change in days worked. A graphic depiction of the effects of case-mix adjustment is presented in Exhibit 2 which shows the difference between unadjusted and adjusted rankings.

Implications

The results of this analysis confirm the need to use case-mix adjustment methods to assess substance abuse treatment provider effectiveness. Although researchers have long been aware of this finding, it is now crucial for government agencies and treatment providers to become more familiar with the case-mix adjustment methods and recognize the importance of case-mix adjustment analysis. These analyses reduce the risk of drawing inappropriate conclusions about treatment effectiveness and lead to appropriate funding

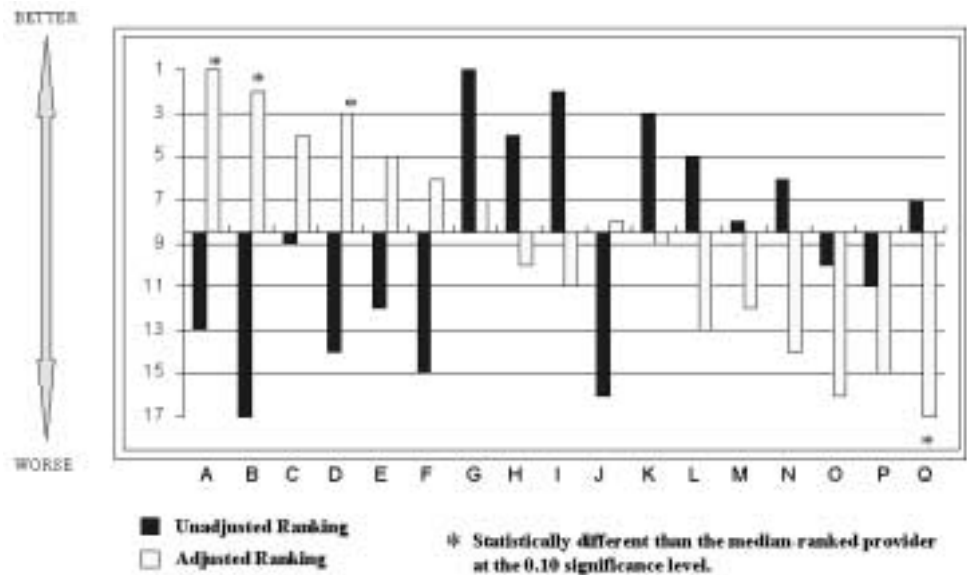
Using Case-Mix Adjustment Methods to Measure the Effectiveness of Substance Abuse Treatment (cont.)

The following implications can be drawn from this analysis:

- Case-mix adjustment methods can be used to assess substance abuse treatment provider effectiveness regarding client outcomes.
- One analytic priority should be to look at “employment” beyond just “days paid for work.”



Exhibit 2
Adjusted and Unadjusted Outpatient Rankings



decisions as well as higher quality care. This work also indicates the importance of incorporating as much information as possible when looking at provider effectiveness.

Implications for Research/Analysis

This analysis suggests several areas for future investigation, including:

- Testing other employment-related outcome measures beyond just “days paid for work.” The quality of the work should be addressed, along with other factors such as the stability of a client’s working history, rate of pay, and the economic conditions of the region.
- Studying how employment outcomes are affected by variations in therapeutic approach and structural features of providers, neither of which were part of the database for this study.

- Examining methods for studying providers in terms of multiple outcome domains. Analysis that explores different weighting schemes for different outcome domains will be particularly important to policymakers who seek global measures of provider effectiveness.

- Designing data systems and studies to make it possible to perform case-mix analysis, since few treatment effectiveness studies have ranked performance of providers.

Implications for Policy

This analysis contributes to building a case for helping substance abuse treatment systems to be accountable for their performance. Public policy has an obligation to ensure that both consumers and those paying for treatment (public agencies and private insurance) have information about more effective and less effective providers, in order to

Using Case-Mix Adjustment Methods to Measure the Effectiveness of Substance Abuse Treatment (cont.)

learn from the former and improve the latter. The case-mix techniques applied in this analysis demonstrate that it is possible to methodically “level the playing field” and generate “adjusted” performance rankings of substance abuse providers.

Implications for Practice

The analysis also confirms that treatment providers serving different clients will have different outcomes, and that providers with clients who have more severe problems need to be viewed differently than those whose clients have less severe problems. It is crucial for providers to become involved in the process of developing measurement systems that are fair and realistic. The authors of this analysis assert that case mix analysis is performed most successfully if it is done in conjunction with site visits and case studies.

Future Steps

Case-mix adjustment is an important tool, but remains a first step. Case-mix adjustment by itself does not allow

researchers to explore why some providers are more effective than others. This requires further analysis, and further talking with the providers themselves, so that more information can be gained about what works. Policy makers should always confirm the conclusions of case-mix performance rankings with direct information. Managers, staff and clients can provide invaluable information to either validate or explain rankings, and this ultimately results in improved services.

Reference

Koenig, L., Fields, E.L., Dall, T.M., Ameen, A.Z., & Harwood, H.J., *Using Case-Mix Adjustment Methods to Measure the Effectiveness of Substance Abuse Treatment: Three Examples Using Client Employment Outcomes*. March 2000. Prepared under the NEDS contract by the Lewin Group.

For more information, please contact the National Evaluation Data Services analysis team at (703) 385-3200, or visit the NEDS Web site.

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