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Treatment Program Operations and Costs

Kirk M. Broome, PhD, Danica K. Knight, PhD, George W. Joe, Ed.D, and Patrick M. Flynn, PhD

Institute of Behavioral Research, Texas Christian University, TCU Box 298740, Fort Worth, TX 76129, United States

Abstract

This study investigates how average costs for an episode of care in outpatient drug-free (ODF) treatment relate to clinical intensity (length of stay and weekly counseling hours) and program structure (e.g., size, staffing), controlling for prices paid and selected clientele measures. Based on cost assessments from a naturalistic sample of 67 programs located across the US (using the Treatment Cost Analysis Tool), robust regression techniques showed that programs having 10% longer treatment stays had episode costs 7% higher; those having 10% more weekly counseling hours per client had 4% higher episode costs. Other important factors included wages, amount of counselors' time conducting sessions, and serving more clients referred from the criminal justice system. The study provides valuable information on treatment program features that relate to costs. Most importantly, cost differences associated with longer stays or more intensive counseling protocols appear modest, and may be justified by improved client outcomes.

Keywords

Outpatient treatment; treatment costs; cost function

1. Introduction

Understanding the costs associated with providing substance abuse treatment is essential to ensuring that limited treatment resources are put to good use. However, in spite of the widespread attention given to documenting costs (Cartwright, 2008; French, Popovici, & Tapsell, 2008; Roebuck, French, & McLellan, 2003; Zarkin, Dunlap, & Homsy, 2004), comparatively little research has focused on factors driving program-to-program variations. Identifying differences in program clinical approach and structure that are linked to the costs of care would contribute to organizational decision making.

Investigations of this sort are relatively common in other areas of health care research. Studies of hospitals (Bilodeau, Crémieux, & Oullette, 2000; Grannemann & Brown, 1986; Rosko & Broyles, 1988), as well as nursing homes (Bishop & Dor, 1994) and physician practices (Escarce, 1995) have explored costs and developed "cost function" models relating cost to other factors. Through several decades of work, these studies have yielded

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Correspondence should be sent to Patrick M. Flynn, Institute of Behavioral Research, Texas Christian University, TCU Box 298740, Fort Worth, TX 76129, Telephone: (817) 257-7226, fax: (817) 257-7290, p.flynn@tcu.edu, k.broome@tcu.edu, d.knight@tcu.edu, g.joe@tcu.edu.

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increasingly sophisticated and flexible models describing the relationships between costs, quantities of output, mix of outputs produced, and input prices paid (Li & Rosenman, 2001). This body of work also goes beyond understanding input-output relationships and shows how facility characteristics including objectives, ownership, location, and case mix can affect costs (Rosko & Broyles, 1988). Identifying relevant features of the organizational context makes these models especially informative for managerial decision making, by creating a bridge between clinical and design features on the one hand and business-oriented cost outcomes on the other.

Only a few studies of this sort have been conducted within substance abuse treatment. Two used data from the U.S. Alcohol and Drug Services Study (ADSS; Substance Abuse and Mental Health Services Administration, 2003) to examine the costs of outpatient drug-free (ODF), non-methadone programs, the most common form of treatment available in the U.S. (Beaston-Blaakman, Shepard, Horgan, & Ritter 2007; Duffy, Dunlap, Feder, & Zarkin, 2004). The two approached the data in slightly different ways: Duffy and colleagues (2004) considered total annual program costs, and later Beaston-Blaakman et al. (2007) considered the costs per treatment episode and per day, reasoning that these values might be more relevant for clinicians. Both analyses showed larger programs tended to have lower costs per client, meaning larger programs could have a potential advantage in delivering care. In contrast to hospital studies, neither investigation found program clientele differences to have much impact on costs. They examined demographic and other case mix variables, but the effects generally were small and non-significant. Beaston-Blaakman and colleagues (2007) also identified several other clinical and organizational features that resulted in higher costs. In particular, longer average length of stay led to higher episode costs, but lower daily costs. Other important predictors of higher costs included more frequent client visits, a broader mix of comprehensive services, higher staff wages, and counselors spending a lower proportion of their time conducting sessions.

Similar analyses undertaken for other modalities have had comparable results. Larger methadone (Dunlap, Zarkin, & Cowell, 2008) and residential programs (Harwood, Kallinius, & Liu, 2001) have been linked with lower per-client costs. Higher per-client costs for methadone programs were associated with paying higher counselor wages and operating independently of a larger, central organization (Dunlap et al., 2008). As in the ODF treatment studies, clientele measures were not significant predictors of methadone program costs (Dunlap et al., 2008). Finally, although French et al. (2008) focused primarily on characterizing the typical distribution of costs in various modalities to guide funding decisions, they observed the same correlation of higher episode costs with smaller program size and longer average length of stay.

1.1. Current Study

This study builds upon earlier analyses of costs for substance abuse treatment, focusing specifically on the cost of an ODF treatment episode, a key programmatic output for directors and counseling staff. An episode of care for a single client is a clinically-meaningful and easily interpretable unit with costs relevant to program planning decisions. Establishing and justifying an appropriate episode length is central to therapeutic decision making, and has become increasingly challenging in an era of managed care (Shwartz, Mulvey, Woods, Brannigan, & Plough, 1997). By focusing on episode costs, the current study is most similar to the work of Beaston-Blaakman et al. (2007), but builds upon those authors' work with specific hypotheses about clinical activity defining the episode. The primary study objective is to assess how variations in program clinical approach and organization relate to episode costs, considering also the prices programs pay and the clientele they serve.

We consider two key measures of clinical activity – the average length of a treatment stay, and the average number of counseling hours clients receive each week. Outcome studies have used both time in treatment (Hoffman et al., 1996; Hubbard, Craddock, Flynn, Anderson, & Etheridge, 1997; Simpson, Joe, Fletcher, Hubbard, & Anglin, 1999; Zhang, Friedmann, & Gerstein, 2003) and counseling sessions (Fiorentine & Anglin, 1996, 1997; Hoffman et al., 1996) to characterize a clients' "dose" of treatment, and show that both relate to relapse and other indicators. However, maximizing length of stay conflicts with cost-reduction pressures of managed care systems (Shwartz et al., 1997), leading to tension between practitioners and payers over "appropriate" courses of treatment. For this reason, the cost implications of differing durations or counseling exposure should be examined more closely.

In the current study, our special interest is the relative costs of longer episodes or more intensive counseling. The difference in program resources used may be smaller than the difference in days or counseling hours seem to imply. For example, longer stays tend to use more resources in total and are associated with higher episode costs (Beaston-Blaakman et al., 2007; French et al., 2008). However, treatment activities are not necessarily the same throughout the duration of the episode. When clients present for treatment, program staff must conduct assessments and intake interviews, coordinate with other service professionals, and plan treatment. Such front-loading of services may make the early days of treatment more labor-intensive and expensive. In ODF, intake activities may account for over half the cost of treating a client (Anderson, Bowland, Cartwright, & Bassin, 1998). We anticipate, therefore, that longer stays will be associated with higher episode costs, but that the cost difference will not be directly proportional to the time difference (e.g., 10% longer stays will be reflected in costs that are *less than* 10% higher). Assessment and planning activities also are the first step for any counseling regimen, and must be completed regardless of the eventual frequency of sessions. Furthermore, conducting any counseling requires that staff have sufficient training and appropriate materials available. Offering each client more frequent counseling will not necessarily lead to more use of these resources. We anticipate that more weekly counseling hours will be associated with higher episode costs, but that the cost difference will not be directly proportional to the difference in hours (e.g., 10% greater counseling hours will be reflected in costs that are *less than* 10% higher).

Although primary substance abuse counseling reflects the core objective for treatment, programs frequently must offer additional services to support client needs (D'Aunno & Vaughn, 1995; National Institute on Drug Abuse, 1999). These comprehensive service offerings are also expected to shape treatment costs. In general, a broader mix of service offerings is likely to be reflected in higher episode costs (Anderson et al., 1998). Some particular service packages are likely to be especially costly, however, such as specialized programming for women with children. Services for parenting women involve a diverse staff skill set, and are subject to a wide range of external constraints (Knight, Hood, Logan, & Chatham, 1999); for example, any child care component will be governed by additional state regulations regarding facilities and staffing.

These clinical activities take place in a broader organizational context, and the way each program is designed, staffed, and managed is expected to affect its costs. A common concern is with program size. As described above, prior investigations have shown programs that treat more clients typically do so at a lower cost per client. We anticipate finding a similar pattern. Besides size, however, other organizational features are expected to relate to costs. Where counselors spend a greater proportion of their time conducting counseling sessions (versus activities such as paperwork, meetings, and training), treatment episode costs are expected to be lower (Beaston-Blaakman et al., 2007). In contrast, programs that offer both regular (less than 6 hours of structured programming per week) and intensive

(more than 6 hours) levels of outpatient care are expected to have higher costs, compared to programs providing treatment episodes of similar duration and counseling intensity in a single level of care (Flynn et al., 2009). The added cost would reflect the administrative burden of managing and coordinating two separate tracks. Relying more on degreed counselors, as opposed to paraprofessionals, may lead to higher costs because degreed counselors may receive higher wages. Programs following a for-profit business model may be motivated to keep costs low in order to maximize profits.

The cost of a treatment episode is also anticipated to reflect the prices paid for staff, facilities, and other resources. Economic theory and empirical investigations in substance abuse treatment (Beaston-Blaakman et al., 2007; Dunlap et al., 2008), as well as other areas of health care (Li & Rosenman, 2001; Rosko & Broyles, 1998), emphasize the role of input prices in determining costs. Labor costs make up a substantial portion of the budget for most programs (Substance Abuse and Mental Health Services Administration, 2003), and are expected to be an especially important factor. Rural programs may also experience lower costs as a consequence of paying lower prices for resources.

Clients often face a constellation of challenges related to their substance use that can affect their ability to participate in and benefit from treatment. Logically, differences in the clientele or case-mix of the program would be reflected in the treatment costs. Prior research (described above) has not been especially successful at identifying important clientele characteristics, but the significance of such measures in hospital costing studies (Li & Rosenman, 2001; Rosko & Broyles, 1998) justifies continued exploration. This study focuses specifically on two clientele characteristics of particular interest: the proportion of clients with a comorbid psychological condition or “dual diagnosis,” and the proportion referred for treatment through the criminal justice system (CJS). Dual diagnosis clients are likely to need mental health and other services, so that serving such clients may be associated with higher costs. The need for additional services has made the dually-diagnosed caseload one of the more widely-studied clientele factors, although empirical results have been mixed: Beaston-Blaakman and colleagues (2007) found some evidence of higher costs for programs treating greater percentages of these clients, but Duffy et al. (2004) and Dunlap et al. (2008) did not. Conversely, the mechanism of CJS referral may lead to clients entering treatment with less severe substance use problems than found in many voluntary admissions. Some CJS clients will be undergoing treatment in connection with “driving while intoxicated” (DWI or DUI) convictions, for example, rather than for use of illegal drugs. Likewise, because the CJS will often contract with community providers for treatment slots, programs may have an incentive to keep costs lower. Together these features suggest that programs with proportionately more CJS referrals may have lower treatment costs.

2. Method

2.1. Sample

As part of the Treatment Costs and Organizational Monitoring (TCOM) project, data were collected beginning in 2004 and 2005 from 115 Outpatient Drug-Free (ODF) treatment programs for adults in 9 U.S. states: Florida, Idaho, Illinois, Louisiana, Ohio, Oregon, Texas, Washington, and Wisconsin. These programs were recruited in cooperation with the Addiction Technology Transfer Centers (ATTCs) in the Southern Coast, Great Lakes, Gulf Coast, and Northwest regions, using a naturalistic quota-based sampling strategy to provide adequate coverage of geographic areas and program types. Overall project goals were to develop an integrated system for assessing and monitoring program operations, costs and resources, staff, and clients, and to examine relationships among these program attributes and changes over time. The present study examines a subset of 67 TCOM programs. These

programs provided complete data for calculating unit costs of treatment during the 2004–2005 data collection period.

2.2. Procedure

The study relied on data from two main sources: a Survey of Structure and Operations (SSO; Knight, Broome, Simpson, & Flynn, 2008) and a cost assessment using the Treatment Cost Analysis Tool (TCAT; Flynn et al., 2009). The SSO was completed upon enrollment in the project, usually by a program director or other administrator. It included information about general program characteristics, organizational relationships, clinical assessment and practices, services provided, staff and client characteristics, and recent changes.

The TCAT is based upon the costing technique used in ADSS (Substance Abuse and Mental Health Services Administration, 2003). The TCAT captures information on clinical activities (e.g., client admissions and length of stay), labor costs (e.g., staff types and wages, fringe benefits), and non-personnel costs (e.g., building rent, utilities, administrative overhead). These also include nonfinancial or “economic” costs, such as the value of volunteer time and donated goods, to estimate better the full cost of treatment. The TCAT is a set of linked Microsoft Excel® spreadsheets, with embedded results and diagnostic information to assist in the data-collection process (Flynn et al., 2009). Typically, a financial officer or program director completed the TCAT based on the most recently-completed fiscal year. Files were emailed back to Texas Christian University and reviewed by project staff. Out of range, inconsistent, or missing data were verified and updated through an intensive callback strategy, using telephone and email contact. Although limitations in program record keeping for volunteer time and donated goods could lead to potential underestimation of these costs, any omissions are expected to be small as a consequence of the review process.

2.3. Measures

2.3.1. Cost per treatment episode—The dependent variable of interest is the cost of an episode of ODF treatment, reflecting the total number of days between treatment admission and discharge. It is an average cost across all clients admitted during the year. In the current sample, these costs were based on fiscal years 2004 or 2005 (depending on each program’s specific financial reporting period). Costs were inflated to 2006 dollars using the consumer price index (Bureau of Labor Statistics, 2009). Finally, before inclusion in the regression analysis, the measure was transformed by taking the natural logarithm of the costs. Using the log transformation conveys two advantages (Wooldridge, 2003) by (1) giving the regression coefficients the interpretation of proportional differences in costs, as described more fully below, and (2) improving the distribution and reducing the impact of outliers.

2.3.2. Clinical activity—Four measures described typical clinical activity within programs. The average length of stay over the 1-year reporting period was measured in days. Average weekly counseling hours represented the average amount of time each client spent in counseling sessions during a typical week. Although programs typically used both individual and group formats, most of the counseling hours each client received came from group sessions (on average, about 4.0 hours per week out of 4.7 hours total); variations in counseling hours across programs also strongly reflected differences in group counseling schedules ($r = .99$ between group hours and overall hours, versus $r = .13$ for individual hours). For analytic purposes, the natural log was taken for both of length of stay and counseling hours. An indicator variable represented whether a program had a significant focus on women and children: offering both specialized programming for women with children, and having either child care or parenting instruction available onsite. Finally, a summary index captured onsite availability of comprehensive services in seven general

areas: medical, psychiatric, family, educational, vocational, financial, or legal services. Program directors reported service offerings as part of the SSO instrument (Knight et al., 2008), using a checklist to indicate services that were (a) not provided, (b) provided by the program onsite, or (c) provided only by referral.

2.3.3. Program structure—Five measures reflected program structural features. Programs were classified as offering a single level of care – either intensive outpatient (at least 2 hours of structured programming on 3 days per week) or regular outpatient (less than 6 hours of structured programming each week; Substance Abuse and Mental Health Services Administration, 2007) – or a combination of the two levels referred to as “mixed.” The average daily census was computed as the number of annual admissions times the ratio of average length of stay to 365 (i.e., the ratio expresses length of stay as a proportion of a year). The natural log of the daily census was used in analyses. An estimate of the proportion of counselors’ time spent in counseling was computed as the annual number of counseling hours conducted, divided by total work hours. The proportion of degreed counselors was defined as the number of FTE counselors with bachelors, masters, or doctoral degrees divided by the total number of counselor FTEs. An indicator for business model was included, contrasting for-profit programs with any not-for-profit (either private or public).

2.3.4. Cost of input resources—Costs of resources used in conducting treatment were represented with three measures. A wage and benefit index reflected the compensation paid to program staff. It was computed using both an hourly wage estimate for each job category (e.g., bachelor counselors, master’s counselors, senior managers) and the appropriate fringe benefit rate. For each program, ratios were constructed comparing wages (including fringe benefits) to the sample mean within each job category; the ratios were then averaged across job categories. To represent variations in prices for non-personnel items, the “practice expenses” component of Medicare’s geographic practice cost index (Centers for Medicare & Medicaid Services, 2009) was included. The natural log of each index was used for analysis. Finally, rural programs were compared with metropolitan ones, helping to control for differences in costs that were not explicitly measured, such as security or advertising.

2.3.5. Clientele factors—Program clientele measures reflected admissions from two special populations: referrals from the criminal justice system (CJS) and “dual diagnosis” clients with a comorbid psychological condition. Program directors reported the proportion of admissions from each group. A few programs did not provide this information: one for CJS referrals and three for dual diagnosis. In these cases, the missing proportion was recoded to zero, and an additional indicator showing missing data was included. In principle, this approach corresponds to adding a “don’t know” category. When both the proportion measure and the indicator for missing data appear together as predictors in the model, the regression coefficient for the measure describes differences in costs associated with differences in the known proportions.

2.4. Statistical Analysis

The goal of the analysis was to relate treatment episode costs to program features. However, it is not unusual for economic data to include extreme cases (outliers) whose costs are disproportionately high. In addition to modeling the natural logarithm of the costs, the current study used a robust regression approach to avoid distortion by outliers. These analyses were carried out with the ROBUSTREG procedure of SAS (SAS Institute Inc., 2004), and employed an iteratively reweighted least squares algorithm to reduce the impact of cases with high robust residuals (Huber, 1973).

The model to be tested was as follows. The logarithmically-transformed episode costs were related to average length of stay and weekly counseling hours (also log-transformed), also taking into account the size of the program (the census, log-transformed) and other program structural characteristics, input costs, and clientele. Thus, the regression equation was specified as,

$$\ln COST = \beta_0 + \beta_1(\ln STAY) + \beta_2(\ln HOURS) + \beta_3(\ln CENSUS) + \sum_{s=1}^7 \beta_s(STRUCTURE) + \sum_{i=1}^2 \beta_i(INPUTS) + \sum_{c=1}^2 \beta_c(CLIENTS)$$

Using logarithmically-transformed variables led to a logarithmic functional form, allowing costs per unit to decrease or increase across the distribution of the predictor. Both previous studies of ODF costs (Beaston-Blaakman et al., 2007; Duffy et al., 2004) relied on a similar logarithmic (and log-linear) specification, and employing it here allows us to maintain consistency with that approach. The model included the domains that were theoretically important to understanding variations in program costs, and incorporated necessary covariates to improve inference. However, it was a detailed model for a sample of 67 programs. For greater confidence that key findings did not result from overfitting, we supplemented the full model with separate regressions for each of four domains. The analytic strategy therefore represents a compromise between representing theoretical relationships and accommodating a modest sample size.

Model coefficients can be interpreted as a percentage difference in episode costs because of the natural logarithm transformation of the dependent variable (Wooldridge, 2003). Specifically, for predictors expressed in logarithmic units, the coefficients represent the percentage difference in costs associated with a 1% difference in the predictor. For predictors in their natural units, the percentage difference in costs associated with a 1-unit difference in the predictor can be estimated by exponentiating the coefficient (taking the antilog), subtracting 1, and multiplying by 100. The percentage change, or “elasticity,” interpretation serves as a useful measure of effect size and plays an important role in testing hypotheses about length of stay and weekly counseling hours. For these two clinical activities, we will not only test the standard hypothesis that coefficients are different from 0, but also that they are different from 1.

3. Results

Descriptive statistics for the sample appear in Table 1. On average, programs retained their clients 110 days, and provided each of them with about 5 hours of counseling a week. About half (54%) offered both regular and intensive levels of care. The typical census was just over 100 clients. Program admissions averaged 60% referrals from the criminal justice system (CJS) and 27% dual diagnosis clients.

The average cost for an episode of care was \$1,839 (in 2006 dollars), but programs varied widely in their costs, with a standard deviation of \$3,698. The regression analysis explored that variation more closely. During initial model fitting, however, two programs were identified as outliers and weighted down in the robust analysis. Both programs were small and specialized in treating women with children, and had unusually high episode costs. They serve to illustrate the challenges and costs of treating special populations, but these programs are extreme and atypical of the sample. Indeed, these two programs are so small and highly specialized, and sufficiently costly, that they have large residual values despite controlling size and women’s programming in the model; they appear to be non-standard

ODF treatment programs. Accordingly, the robust analysis reduces the impact of these cases and describes regression relationships based on the remaining 65 programs.

The robust regression results for treatment episode costs appear in the first column of Table 2. As hypothesized, length of stay and weekly counseling hours were significant predictors of costs. The average length of stay was related to the cost of the stay, with episodes that were 10% longer costing about 7% more ($.74, \chi^2(1) = 64.46, p < .001$). The impact of length of stay was also significantly less than 1 ($\chi^2(1) = 7.68, p < .01$), suggesting that program episode costs increase more slowly than the average length of stay. Programs with higher average weekly counseling hours also had higher episode costs ($.40, \chi^2(1) = 25.30, p < .001$), such that 10% more counseling hours were associated with 4% higher costs. Again, the relationship was significantly less than 1 ($\chi^2(1) = 58.47, p < .001$) suggesting treatment cost differences are not directly proportional to differences in the counseling regimen. The two measures of comprehensive services were not significant predictors, though the coefficient representing specialized programming for women with children suggested a moderate increase in cost for these programs (approximately 19%).

The primary structural feature related to costs was the proportion of counselors' time spent conducting counseling sessions ($-.90, \chi^2(1) = 27.95, p < .001$). Specifically, a 10 percentage point increase in counseling time versus time spent in other activities (e.g., a change from 50% to 60%) was associated with a 9% decrease in the cost of a treatment episode. Although larger program size (client census) was hypothesized to lead to lower treatment episode costs, our sample data offered limited evidence supporting such a relationship. The association was not statistically significant at conventional probability levels ($-.06, \chi^2(1) = 2.86, p = .09$; but a one-sided test was significant, $z = 1.69, p < .05$), and the coefficient suggests a modest reduction in costs of less than 1% for a 10% difference in census size. Other structural factors were not significant predictors, though programs offering mixed levels of care potentially have higher costs (16%) than programs offering a single level.

The prices programs pay for resources also affect the cost of treatment. Wages and benefits emerged as an important factor. Programs offering staff greater compensation tended to have higher treatment episode costs ($.84, \chi^2(1) = 9.11, p < .01$). In fact, the results suggest a 10% difference in the wage and benefit index would be reflected in an 8% difference in episode costs, indicating the substantial contribution of personnel to programs' overall costs. In contrast, variation in non-personnel expenses, as represented by the geographic practice cost index, was not a significant predictor.

Finally, among clientele factors, the proportion of program admissions referred from the criminal justice system (CJS) was related to lower episode costs ($-.32, \chi^2(1) = 3.89, p < .05$). Specifically, a 10 percentage point increase in CJS referrals was linked to a 3% decrease in the cost of a treatment episode. The proportion of dual diagnosis clients was not significantly related to costs, despite a coefficient of similar magnitude.

The second column of coefficients in Table 2 shows the results of the separate models for each domain. These are not adjusted for predictors from other domains, and are not appropriate for inference, but they generally show the same program features as being important to understanding cost variations. The only major difference between the two sets of results was in the clientele domain, where the separate analysis suggested the proportion of dual diagnosis clients, rather than CJS referrals, was related to episode cost. Programs serving different client populations also tended to differ in clinical activity and structural features, contributing to a complex relationship between clientele and cost.

Finally, because program size has been a central focus in prior studies, it deserves further comment. Although the analysis did not show a significant connection between size and episode cost, larger size was correlated with other cost-related program features. Larger programs had longer average stays ($r = .29$), offered mixed levels of care ($r = .35$), and served more CJ-referred clients ($r = .23$); larger programs also offered fewer weekly counseling hours ($r = -.20$) and served fewer dual diagnosis clients ($r = -.30$).

4. Discussion

Examining substance abuse treatment program features that relate to the cost for an episode of care in the U.S., we focused on key clinical activities, average length of stay and counseling hours. Results identified various structural, resource, and clientele characteristics that also predict costs, suggesting no single dimension of program operations on its own is sufficient to explain the costs of care. Of course, a full economic evaluation calls for attention both to costs and outcomes to justify decisions about care (Drummond, Sculpher, Torrance, O'Brien, & Stoddard, 2005), though that is beyond the scope of this study. However, our focus on clinical activities that have been linked to better outcomes allows for some connections to be made and indirectly leads us in that direction.

Results supported both portions of our two-part hypotheses regarding duration and counseling. That is, longer treatment stays or more intensive counseling protocols did result in higher treatment episode costs, on average, but these differences were not directly proportional to differences in length of stay or counseling hours. On the one hand, these findings underscore the importance of clinical decisions to match clients with appropriate care, and avoid added cost that would arise from unnecessary assignment to intensive treatment. Nevertheless, some clients do require a more rigorous level of care, and it is essential to maintain adequate funding and reimbursement to serve their needs.

On the other hand, the findings show the added cost of longer stays is smaller than might appear at first glance. That pattern is consistent with the early stages of substance abuse treatment being more effortful and more costly than later stages (Anderson et al., 1998). It fits with prior results for ODF treatment indicating longer stays were associated the higher episode costs and lower daily costs (Beaston-Blaakman et al., 2007). Together, these studies begin to raise questions about cost-containment efforts that limit length of stay. Specifically, the current findings suggest the incremental cost of achieving key clinical milestones may be fairly small. For example, clients who spend more than 90 days in ODF treatment generally are less likely to use drugs in the following year than are clients who spend fewer than 90 days (Hubbard et al., 1997; Simpson et al., 1999). Based on the regression results of the present study, adjusted treatment episode costs are estimated at \$1,072 for a program with a 90-day average length of stay and \$793 for a program with a 60-day average (in 2006 dollars, holding all other predictors constant at their mean), a difference of \$279 for this additional month of care. The incremental cost for a third month seems modest in comparison to outcome differences reported in treatment evaluation studies. Building on these results, detailed cost-effectiveness examinations that compare varying treatment “dosages” (Drummond et al., 2005) would help to guide future decisions about treatment funding.

Within the area of organizational structure, the primary significant predictor of cost was the estimate of counselors' time spent conducting sessions. This measure can serve as a proxy for managerial efficiency (Beaston-Blaakman et al., 2007), and has implications for how programs use staff time. Where counselors spend more of their time counseling, treatment episode costs are lower; however, there are also other important uses of staff time, including professional development activities and clinical supervision. A particular concern is

paperwork and reporting burdens faced by program staff (McLellan, Carise, & Kleber, 2003), which may reduce client-counselor contact. Future research should consider these differing objectives carefully with the goal of identifying an optimal balance.

Anecdotally, program directors and managers involved in the study held widely differing views on what constituted a reasonable target for percentage of time spent counseling. Some sought to maximize this percentage, but many favored a more moderate distribution of staff time. One “rule of thumb” put forward was for counselors to spend between roughly 50% and 65% of their time conducting sessions. Below that range, directors reasoned, revenues from fees and reimbursement may not be sufficient to cover the counselor’s salary; above that range, counselors risked burnout. Such a work schedule also leaves some slack time to accommodate new clients, and to conduct case management, planning, and training activities.

One notable nonsignificant finding concerned the impact of size, as measured by the average daily census. Although other analyses of treatment costs have identified “economies of scale,” where costs per client were lower in larger programs (Beaston-Blaakman et al., 2007; Duffy et al., 2004; Dunlap et al., 2008; Harwood et al., 2001), the current study offered limited support for this principle. However, larger size was correlated with other cost-related program features. Also, with an average daily census of 103.7 clients, the ODF programs in the current sample are slightly smaller than those considered by some other authors (e.g., Beaston-Blaakman et al., 2007; Duffy et al., 2004; French et al., 2008); the range of program sizes under study may affect results. The complex question of program size and its correlates deserves further research. Creating larger programs through mergers and expansion has a variety of potential implications to consider. Larger programs may have potential for bringing cost savings and supporting more specialized treatment offerings, such as gender-specific or age-specific groups, but they might also lead to reduced client access or difficulties with client engagement (Broome, Flynn, Knight, & Simpson, 2007).

The study also found no evidence that the set of comprehensive services offered affect episode costs, unlike some prior investigations that showed these services were important drivers of costs (Anderson et al., 1998). However, the mean of 1.57 services, out of a possible 7, suggested programs in the current sample generally offered few comprehensive services onsite (they were available more often by referral). Anderson and colleagues (1998), working with data collected about a decade earlier, found such services to be more common. That difference suggests the general decline in comprehensive service availability observed by other authors between the 1980s and 1990s (D’Aunno & Vaughn, 1995; Ethridge, Craddock, Duntzman, & Hubbard, 1995) has likely continued.

Although historically clientele factors have been inconsistent predictors of treatment costs (Beaston-Blaakman et al., 2007; Duffy et al., 2004; Dunlap et al., 2008), the present study did find some evidence for lower costs among programs serving proportionately more clients referred through the CJS, controlling for other factors. Lower episode costs would imply programs used fewer resources to treat these clients; for example, programs enrolling more CJS referrals tend to have higher client-to-counselor ratios (Knight et al., 2008). However, the association between program case mix and costs remains tentative and merits further research.

These results must be interpreted within the context of certain limitations. The sample is relatively small, which can affect statistical power. It was for this reason that we commented on the larger effect sizes (elasticities) despite non-significant test results. Cost differences associated with providing programming for women with children or with offering both

regular and intensive outpatient care, in particular, were large enough to merit attention in future research. The sample also is not nationally representative, though it is diverse.

In spite of these limitations, the study provides valuable information on costs of ODF treatment programs, the most widely available type of treatment in the U.S. It adds to existing knowledge on how program organization relates to cost, offering insight on the way changes in clinical activity or design might affect financial performance. Such findings can be relevant outside the U.S. as well, where providers still must meet the demand for care on a fixed or limited budget, and may therefore work to minimize costs (Bilodeau et al., 2000). The study is also a critical step toward establishing the cost-effectiveness of treatment as offered in typical community outpatient settings.

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Table 1

Sample Description

	Mean	SD
Average length of stay (days)	110.00	55.75
Weekly counseling hours	4.73	3.05
Level of care		
Intensive	13%	
Regular	33%	
Mixed (regular & intensive)	54%	
Women & children programming	15%	
Services index	1.57	1.13
Average daily census	103.70	135.10
Counselor time spent counseling (average proportion)	0.64	0.24
Degreed counselors (average proportion)	0.74	0.33
For-profit	22%	
Rural location	24%	
Wage & benefit index	0.98	0.16
Geographic practice cost index	0.99	0.06
CJS referrals (average proportion)	0.60	0.30
Dual diagnosis clients (average proportion)	0.27	0.26

Table 2

Regression Results for Cost per Treatment Episode

Predictor	Full Model	Separate Domains
Intercept	3.84**	
<i>Clinical activity</i>		
Average length of stay (log)	0.74**	0.69**
Weekly counseling hours (log)	0.40**	0.49**
Women & children programming	0.17	0.22
Services index	0.01	0.01
<i>Program structure</i>		
Mixed (regular & intensive)	0.15	0.35**
Average daily census (log)	-0.06 [†]	-0.10 [†]
Counselor time spent counseling (average proportion)	-0.90**	-0.80**
Degreed counselors (proportion)	0.12	0.12
For-profit	0.02	-0.05
<i>Input prices</i>		
Wage & benefit index (log)	0.84**	0.79 [†]
Geographic practice cost index (log)	0.29	0.99
Rural location	-0.04	-0.07
<i>Clientele</i>		
CJS referrals (proportion)	-0.32*	0.03
Dual diagnosis (proportion)	0.30	0.64*
Missing on CJS referrals	-0.09	0.43
Missing on dual diagnosis	0.02	-0.18
R ²	.66	

Note:

[†]
p < .10;

*
p < .05;

**
p < .01