

RESIDENTIAL SUBSTANCE ABUSE TREATMENT FOR URBAN AMERICAN INDIANS AND ALASKA NATIVES

PART II: COSTS

Bentson H. McFarland, MD, PhD; R. Dale Walker, MD; and Patricia Silk-Walker, PhD

Abstract: The present study examined costs of two residential substance abuse treatment programs designed for urban American Indians and Alaska Natives (AI/ANs). Costs for one agency were well within national norms, while costs at the other program were less than expected from nationwide data. Economies of scale accounted for much of the difference between observed and expected costs. Culturally specific residential substance abuse treatment services can be provided to urban AI/ANs within budgets typically found at mainstream programs.

INTRODUCTION

Urban American Indians and Alaska Natives (AI/ANs) are more likely to obtain substance abuse treatment than are other city residents. For example, analyses of the 2013 National Survey on Drug Use and Health showed that 2.3% of urban AI/ANs used specialty substance abuse treatment in the year prior to survey, versus 0.9% of non-Natives. Moreover, 1.4% of urban AI/AN survey respondents reported using residential substance abuse treatment in the previous year versus only 0.4% of non-Natives.

Unfortunately, resources are markedly limited for urban AI/AN substance abuse treatment (Legha & Novins; 2012; Wright et al., 2011). Indeed, Roubideaux (2002) discussed “the severe levels of under-funding and lack of resources in the Indian health system and the need for more funding for Indian health care” (p. 1403) while Lillie-Blanton and Roubideaux (2005) noted that “large disparities exist in the funding and availability of health services for AIAN people relative to other Americans” (p. 759). Moreover, as Roubideaux (2002) pointed out, “lack of adequate funding and services is a constant stress on the Indian health system” (p.

1402). Focusing on city dwellers, Castor et al. (2006) reported that “although UIHOs [Urban Indian Health Organizations] are the primary health care venue for urban American Indians/Alaska Natives, who represent more than 60% of the nationwide AI/AN population, IHS [Indian Health Service] allocations for these organizations represent 1% of the total IHS budget” (p. 1484).

These resource constraints are especially pertinent for residential substance abuse treatment programs, which have notably higher costs than outpatient services (French, Popovici, & Tapsell, 2008). To our knowledge, no data are available about the costs of residential substance abuse care for urban AI/ANs. Although Saylor (2003) described services provided to AI/AN clients of residential programs in Oakland and San Francisco and Wright et al. (2011) discussed services (especially traditional healing programs) for outpatient and residential clients of an agency in Oakland that focuses on AI/ANs, costs were not addressed. It is worth noting that this situation is in marked contrast to the extensive literature on costs of general population residential substance abuse treatment programs (Alexandre et al., 2012; French, Dunlap, Zarkin, McGeary, & McLellan, 1997; French, Salome, Sindelar, & McLellan, 2002; French et al., 2008; Roebuck, French, & McLellan, 2003).

The lack of cost information is especially noteworthy because economic data are needed by policymakers and funders who must decide on provision and financing of treatment programs (French et al., 1997; French & Drummond, 2005) for the rapidly growing urban AI/AN population. Moreover, substance abuse treatment program managers and developers need cost data in order to construct sustainable service packages for urban AI/ANs.

In particular, data comparing costs for residential programs focused on urban AI/ANs versus costs for mainstream (general population) residential treatment services would be useful. It could well be imagined that programs with culturally specific services are more costly than conventional care. Indeed, programs that have been described (e.g., Wright et al., 2011) often provide services specific to AI/ANs (such as sweat lodges) that are complements to (rather than substitutes for) conventional substance abuse treatments. The implication is that the more extensive AI/AN programs would have higher costs than mainstream services. However, there have been few (if any) comparisons of costs between agencies focusing on AI/ANs and mainstream treatment programs.

In addition, AI/AN clients of urban residential programs may have more severe substance abuse-related problems than their non-Native counterparts. For example, the 2012 Treatment Episode Data Set (described below) showed that first substance use was under the age of 12 years for 12% of AI/ANs admitted to urban residential treatment agencies, versus only 7% for non-Natives. And only 7% of AI/AN admissions were for employed clients, versus 9% for non-Natives. Both factors are associated with increased severity of substance abuse (McCamant, Zani, McFarland, & Gabriel, 2007). Indeed, previous research shows that severity indicators, such as length of substance abuse, are powerful predictors of treatment outcomes (Caspi, Turner, Panas, McCarty, & Gastfriend, 2001; Chong & Lopez, 2007; McCamant et al., 2007). For example, Chong and Lopez (2007) found that, for AI women in Arizona, the number of prior alcohol treatment episodes was highly predictive of relapse to drinking 6 months after completing the index (current) urban residential treatment program. Specifically, each prior alcohol treatment episode increased the odds of relapse by 90%. Therefore, it is reasonable to hypothesize that greater severity of clients' substance abuse would translate into higher costs for AI/AN programs versus mainstream care.

For these reasons, we undertook this project to a) examine costs of service provision at residential substance abuse treatment programs designed for urban AI/ANs and b) compare the study facilities with information from general population programs. The hypothesis to be tested was that the culturally specific programs would be more costly than analogous mainstream treatments.

METHODS

Agencies to be studied were selected based on the following criteria: a) chiefly serving urban AI/ANs, b) providing residential substance abuse treatment, and c) offering short-term and/or long-term residential programs. In this context, "urban" refers to metropolitan areas (also known as Core Based Statistical Areas; i.e., cities) as defined by the U.S. Census Bureau. Residential substance abuse treatment, as defined by the Substance Abuse and Mental Health Services Administration (SAMHSA, 2007), is a nonhospital, nondetoxification rehabilitation program whose clients stay overnight at the facility. Short-term programs typically have 30-day (or less) planned lengths of stay, according to SAMHSA, whereas long-term programs have planned lengths of stay greater than 30 days. The study years were chosen to include 2006 so that

cost data could be compared with national figures provided by French et al. (2008). Given research resource constraints, the sample was limited to two study agencies (denoted Agency A and Agency B). A companion paper describes the study agencies in detail (“Residential substance abuse treatment for urban American Indians and Alaska Natives Part I: Services and staff,” in this issue).

Both programs are private, not-for-profit agencies funded by numerous entities including IHS and Medicaid. The two programs maintained their own financial data and reported service utilization to their respective state substance abuse agencies. Both study agencies utilized Microsoft Excel software for financial records and both had annual independent audits of finances. The agencies were also similar in that they owned their residential treatment program properties and equipment. Thus, neither agency had facility lease or rent expenditures. Fiscal years for the two agencies were the same (July 1 through June 30).

Procedures

The project began with extensive discussions between agency staff (including senior leaders) and members of the research team, leading to agreement on the study protocol. In addition, the meetings served to introduce the project to agency staff members. Each agency hired a masters-level AI/AN researcher who facilitated data acquisition. In addition, the directors of the two agencies served as consultants to the project.

All interviews, data collection, data entry, and preliminary data management pertaining to costs were conducted by a doctoral level AI researcher. Cost information was obtained with the Brief Drug Abuse Treatment Cost Analysis Program (Brief DATCAP), which is described subsequently. Data sources included Microsoft Excel spreadsheets for financial records, annual audits, category-specific Excel spreadsheets, and face-to-face and telephone interviews, as well as email correspondence to transmit and clarify data from each agency. Data were obtained for three consecutive fiscal years (2005-2006, 2006-2007, and 2007-2008).

Following protocols developed by French et al. (2002) and described in the DATCAP User’s Manual (French, 2002), a letter of introduction to the project and a copy of the instrument were provided to each agency. At subsequent meetings, the financial officer and the treatment program director of each agency reviewed data needs, sources, and mechanisms for data retrieval

and sharing. Neither agency received remuneration for staff time, although both agencies received gift cards and a copy of their data for program use.

It should be noted that the two agencies had similar but not identical accounting procedures. For example, Agency A included labor costs for mental health staff in the residential program budget. Conversely, mental health services for Agency B clients were provided as part of the outpatient program.

Measures

Brief Drug Abuse Treatment Cost Analysis Program (DATCAP)

Cost data were obtained via the Brief DATCAP, which is a public domain instrument (Alexandre et al., 2012; French, 2002; French et al., 1997; French et al., 2008; French, Roebuck, & McLellan, 2004; French et al., 2002) available online that is widely used to ascertain costs of substance abuse treatment. The DATCAP approach to program costs involves collecting data on numbers of clients, program personnel, contracted services, buildings and facilities, equipment, supplies and materials, and miscellaneous resources consumed (mortgage and interest, property taxes, insurance, maintenance, and utilities are included here). DATCAP generates both accounting costs and economic (also known as opportunity) costs for substance abuse treatment programs.

National Comparison Data

National data sets were used to provide comparisons. For convenience, agencies in the national data sets will be referred to as “mainstream” programs. This information was accessed online via the Substance Abuse and Mental Health Data Archive, then at the Inter-University Consortium for Political and Social Research maintained by the University of Michigan. For the national data sets, “urban” admissions, discharges, and agencies, respectively, were defined as those within Core Based Statistical Areas (i.e., cities).

The SAMHSA-supported Treatment Episode Data Set (TEDS) compiles information about admissions to and discharges from virtually all publicly funded substance abuse treatment programs in the United States (Albrecht, Lindsay, & Terplan, 2011; Mutter, Ali, Smith, & Strashny, 2015; Stahler, Mennis, & DuCette, 2016; Terplan, Smith, Kozloski, & Pollack, 2010). The unit of analysis is generally the admission (or the discharge), so that a given person may be represented more than once. Data from 2006 were examined pertaining to discharges of AI/ANs

from residential rehabilitation programs located in Core Based Statistical Areas. There were 2,075 discharges from short-term programs and 2,668 discharges from long-term programs.

Another data set provided by SAMHSA is the National Survey of Substance Abuse Treatment Services (NSSATS). This mail, telephone, and Internet survey encompasses the overwhelming majority of publicly funded chemical dependency treatment agencies (with a response rate above 95%). Data from the survey are used to populate the online Substance Abuse Treatment Facility Locator. The survey includes a checklist where respondents indicate which services are provided by their agencies. In addition, the survey asks respondents about numbers of admissions, current census, and numbers of residential treatment beds. However, client demographic data (such as race and ethnicity) are not included. Data from the 2006 survey were obtained pertaining to 3,539 agencies in Core Based Statistical Areas that offered either short- or long-term residential (nonhospital) treatment services.

Nationwide cost data were obtained from an older project supported by SAMHSA. The Alcohol and Drug Services Study (ADSS) was a national examination of publicly funded substance abuse treatment agencies conducted from 1996 through 1999 (Reif, Horgan, & Ritter, 2011; Woodward, Das, Raskin, & Morgan-Lopez, 2006; Woodward, Raskin, & Blacklow, 2008). Briefly, the study included a random sample of 530 urban nonhospital residential substance abuse treatment agencies (with a response rate of 91%). Facility administrators responding to telephone interviews in 1996 provided information about the agency (such as numbers of clients in residence on the survey date) and about staff members. These responses appear to be the most recent nationally representative data about urban residential treatment center costs.

The nationwide ADSS cost study was used in conjunction with data from French et al. (2008) to estimate economic costs of 48 nationally representative residential treatment programs that were comparable to the two study agencies. The project computed accounting costs in 1996 dollars (SAMHSA, 2003). Note that accounting costs are similar to but not the same as economic costs (Woodward et al., 2008).

The ADSS accounting costs per client per day varied with the average daily census. As expected (French et al., 2008; Woodward et al., 2008), the daily accounting costs per person declined with increasing program size. In particular, the logarithm of the daily accounting cost per client declined linearly with the logarithm of the average daily census. Consequently,

comparisons between study agency costs and national data needed to address program size. Therefore, the ADSS accounting cost data were employed to adjust for program size via the following approaches.

In the first step, the ADSS daily accounting costs were converted into weekly economic costs. Detailed data on weekly economic costs were obtained (French, personal communication, October 13, 2013) for 21 adult residential treatment programs studied by French et al. (2008). Percentiles were computed for the weekly economic costs of the 21 adult residential programs (French et al., 2008). Next, percentiles of daily accounting costs were computed for the 48 residential programs in the ADSS cost study using facility weights and addressing the complex sampling design. The weekly economic cost percentiles from French et al. (2008) were linked with the closest 21 ADSS daily accounting cost percentiles. The logarithms of weekly economic costs (French et al., 2008) were regressed on the logarithms of ADSS daily accounting costs via weighted regression incorporating the complex sampling design. This regression yielded an R^2 of 0.703. Then the logarithms of the ADSS daily accounting costs were converted into estimated logarithms of weekly economic cost via the relationship

$$\text{estimated logarithm of weekly economic cost} = 4.165 + (0.576 * \text{logarithm of daily accounting cost})$$

In the second step, a prediction equation was constructed for the estimated logarithm of weekly economic costs based on the logarithm of the average daily census in the ADSS residential cost study. The estimated logarithms of the weekly economic costs were regressed against the logarithms of the ADSS point prevalence using weighted regression and accounting for the complex sampling design. The resulting prediction equation was

$$\text{predicted logarithm of weekly economic cost} = 7.324 - (0.229 * \text{logarithm of point prevalence})$$

which had R^2 of 0.285 and standard error of estimate of 0.292. Heteroscedasticity was excluded via visual examination as per Rosopa, Schaffer, and Schroeder (2013) and via the test described by Breusch and Pagan (1979), which was not statistically significant.

The third step was to predict the expected mean weekly economic costs for the study agencies based on the two programs' average daily census figures. Assuming a Gaussian

distribution, the expected first and third quartiles were computed as the predicted mean minus or plus (respectively) the standard error of estimate times 0.675. These estimates were then exponentiated to yield predicted means and quartiles for the weekly economic costs (in 2006 dollars).

The project was approved and overseen by the Oregon Health & Science University Institutional Review Board. Data analysis used SPSS version 20.

RESULTS

Study Agency Compared to National Demographics

State substance abuse agency data in the two right columns of Table 1 showed that the study agencies overall (outpatient plus residential) had roughly 600 to 800 admissions annually. Study Agency A served mainly AI/AN clients (68%), whereas approximately half of Agency B clients (45%) were AI/AN. Most clients at the study agencies obtained residential services.

The study agency AI/AN residential clients were mostly unemployed, never married, working-age adults. There was a slight majority of women among Agency A residential AI/AN clients, whereas women residential AI/AN clients were outnumbered by men at Agency B. Most of the study agencies' AI/AN residential clients (70% to 85%) had been arrested at some time. Alcohol was the primary substance of abuse for most of the AI/AN residential clients, whereas injection drug use was uncommon. Most of the AI/AN residential clients completed treatment, and most were described as abstinent at discharge.

Outpatient AI/ANs at the study agencies were mostly male, unemployed, working-age adults, some 60% of whom had been arrested at some time. Again, alcohol was the primary substance for AI/AN outpatient clients, and injection drug use was uncommon. On the other hand, it was rare for AI/AN outpatients to complete treatment, and abstinence at discharge from outpatient care was infrequent.

Table 1 also shows national substance abuse treatment data for non-Natives and AI/ANs, respectively. In contrast to the study agencies, most nationwide admissions were to outpatient programs. Most national residential admissions were for working age, never married, unemployed males. Nationwide employment rates for both non-Native and AI/AN admissions exceeded those for study agency clients. Nationally, alcohol was the primary substance for most

AI/AN residential admissions (56%), but only for 40% of non-Native residential admissions. Needle use was uncommon. Regarding outpatients, study agency client demographics were similar to those for nationwide admissions except that employment rates were lower for study agency clients than for their national counterparts.

Staff data are also given in Table 1. The study agencies (right columns) had more counselors than the national average (left column). Most counselors at Agency A were AI/AN, but not at Agency B.

Table 1
Urban substance abuse treatment admissions, clients, and staff

	United States ^a		Study Agencies	
	Not Native	American Indian	Agency A ^b	Agency B ^c
Total admissions (2002)				
<i>N</i>	1,375,730	24,488	576	750
American Indian	0%	100%	68%	45%
Residential	16%	16%	53%	73%
State general funds			No	34% ^d
	Admissions		American Indian clients	
Residential (2000)				
<i>N</i>	215,479	4,377	207	271
Female	33%	39%	52%	32%
Age 18-64	93%	92%	98%	92%
Never married	61%	59%	51%	65%
Employed	13%	13%	8%	3%
Arrested ^e			85%	70%
Alcohol primary	40%	56%	55%	74%
Needle use	13%	14%	18%	16%
Completed			58%	73%
Abstain ^f			82%	58%
Outpatient (2000)				
<i>N</i>	702,415	11,870	263	63
Female	32%	39%	42%	40%
Age 18-64	89%	89%	100%	100%
Never married	58%	57%	49%	57%
Employed	40%	35%	21%	5%
Arrested ^e			75%	60%
Alcohol primary	42%	50%	57%	81%
Needle use	11%	12%	22%	19%
Completed			5%	28%
Abstain ^f			8%	29%

continued on next page

Table 1 Continued
Urban substance abuse treatment admissions, clients, and staff

	United States ^a		Study Agencies	
	Not Native	American Indian	Agency A ^b	Agency B ^c
	Staff			
	(1996 for United States)		(2002 for study agencies)	
Counselors	4.5 (<i>SD</i> = 12.1; <i>N</i> = 372) ^g		15	16
American Indian counselors	Unknown		10	2

^a Treatment Episode Data Set Admissions for Core Based Statistical Areas. ^b Client Process Monitoring System (Agency A admissions and clients). ^c Treatment and Assessment Report Generation Tool (Agency B admissions and clients). ^d Alcohol and Drug Addiction Treatment Support Act (ADATSA). ^e Arrested in last two years for Agency A or in last year for Agency B. ^f Abstinent at discharge. ^g from Alcohol and Drug Services Study.

Agency A Residential Funding

Funding for residential treatment at Agency A is provided through grants from the state addictions and mental health program, IHS, state and local criminal justice agencies, an agreement with a county family involvement program, Medicaid, private payers (including tribes), and private insurance. All of the billing is handled through Agency A's financial services department. The client's funding source does not influence the treatment approach for that client.

Agency B Residential Funding

At Agency B, direct care services are provided on a sliding-fee basis. Many public and private insurance programs are accepted. Additional funding is received from public and private sources, including federal, state, and local government as well as Medicaid and Medicare. Agency B contracts with IHS under Title V of the Indian Health Care Improvement Act (P. L. 94-437).

Several sources fund the Agency B residential treatment program. Approximately 55 beds are reserved through the state substance abuse agency for services to low-income or indigent people who are assessed as chemically dependent. An especially important revenue source for Agency B is the state Alcohol and Drug Addiction Treatment and Support Act (ADATSA), which provides state-financed (from general funds) treatment and support services to chemically dependent indigent persons. The legislation requires the state to pay for chemical dependency treatment of "alcoholics and addicts" who lack financial resources. If the applicant is found to be chemically dependent and otherwise eligible, the ADATSA case manager schedules an intake appointment at an appropriate chemical dependency treatment facility. Eligible persons can receive up to 6 months of treatment within a 2-year period. Forty-five of the 55 beds are for

patients receiving treatment under ADATSA. Eligibility is further restricted to those who are unemployable as a result of their alcohol or other drug addiction. During 2002, some 34% of Agency B clients received treatment under the ADATSA program (Table 1, right column).

The residential program at Agency B also receives drug court referrals from IHS. In addition, there are clients funded by direct payments from tribes. There are no differences in services provided based on the client's funding source.

Residential Accounting Costs at the Study Agencies

Table 2 shows the accounting costs for the residential programs. Not surprisingly, labor is by far the largest cost category. Over the study years, labor represented 76% of the accounting costs at Agency A and 56% at Agency B. Supplies (such as food) represented the next largest cost category overall. Supplies comprised approximately one tenth of costs at Agency A but one fifth at Agency B.

Crude comparisons can be made with residential data from ADSS, which used somewhat different cost definitions. In the national ADSS study, personnel comprised 63% of total costs for 48 nonhospital residential programs (left column of Table 2).

Table 2
Residential Accounting Costs

Cost Category	United States ^a		Study Agencies			
			Agency A		Agency B	
	Year One	Year Two	Year Three	Year One	Year Two	Year Three
Labor	\$1,431,528	\$1,601,001	\$1,403,359	\$1,252,240	\$1,272,735	\$1,506,377
Supplies	136,969	224,175	261,387	441,034	511,689	554,420
Facilities ^b	0	0	0	0	0	0
Contracts	137,204	129,944	93,072	296,115	214,615	201,387
Equipment	0	0	0	4,269	4,511	4,648
Miscellaneous ^c	151,160	163,962	170,790	292,143	277,033	275,008
Labor percentage	63%	77%	76%	73%	55%	59%

Year One = fiscal year 2005-2006; Year Two = fiscal year 2006-2007; Year Three = fiscal year 2007-2008

^a Alcohol and Drug Services Study 1996. ^b Both agencies own their facility. ^c Miscellaneous includes utilities, fees, taxes, travel, and other expenses.

Study Agency and National Administrative Data

Costs need to be interpreted in view of agency size. As shown in Table 3, Agency A had licensed capacity and physical capacity of 62 beds for all study years. Conversely, Agency B had licensed capacity and physical capacity of 96 beds for all study years except fiscal year 2005-

2006, when licensed capacity was 72 beds. Thus, Agency A had substantially fewer licensed beds than Agency B, especially in the last two study fiscal years.

For comparison purposes, NSSATS for 2006 showed that the average urban residential bed capacity was 33 (far left column of Table 3). With 62 licensed beds, Agency A was at the 88th percentile nationally, while Agency B (with 96 beds) was at the 95th percentile. Thus, both study agencies were much larger than the typical urban residential treatment program with respect to bed counts.

Table 3 also shows average daily census for the two study agencies. Agency A had, on average, approximately 45 clients in residence, whereas Agency B typically had 85 clients. A complication here is that the administrative data for Agency A (such as the average daily census) pertain only to designated (i.e., adult) clients. In other words, the data do not reflect clients' children staying at the Agency A residential program.

Nationwide, the average number of urban residential clients (on the survey date) was 30 (far left column of Table 3). Agency A with, on average, 45 clients was at the 87th percentile for long-term (90-day) urban residential programs. Agency B (with an average of 85 clients) was at the 99th percentile for short-term urban residential agencies. Looking at all urban residential agencies (both short- and long-term) nationwide, Agency B was at the 94th percentile.

Lengths of stay are also presented in Table 3. The Agency A average length of stay (10-12 weeks) corresponds to the long-term nature of its residential program. Analogously, the 5-week average length of stay at Agency B reflects the short-term residential treatment provided to most of its clients. (It should be mentioned that some Agency B clients undertook long-term care after completing short-term residential treatment.) As expected, then, Agency A residential clients had lengths of stay approximately twice that of Agency B clients.

National TEDS discharge data for 2006 showed that urban short-term residential AI/AN clients had an average length of stay of 29 days, or 4 weeks (far left column of Table 3). Urban AI/ANs discharged from long-term residential programs had an average length of stay of 71 days, or 10 weeks. Thus, the study agencies had lengths of stay slightly longer than expected based on national data.

Table 3 shows that Agency A had approximately 80 to 100 residential admissions annually. Inconveniently, the residential admissions data for Agency B are complicated by inclusion of "re-admissions." One approach to these data is to generate estimates based on the

formula “admissions equal census divided by length of stay.” These estimates suggest that Agency B had approximately 200 to 300 annual residential admissions. Using this estimate, Agency A had fewer annual admissions than Agency B.

Nationwide data from NSSATS (left column of Table 3) indicated that, for urban programs providing residential treatment, the average number of admissions in 2006 was 346. However, this nationwide figure combines short- and long-term residential programs and may include admissions to outpatient services (for some agencies in the national survey). As best as can be determined, it appears that the study agencies had somewhat fewer annual admissions than did the average mainstream program.

Table 3
Residential Administrative Data and Economic Costs

	United States^a	Study Agencies					
	2006	Agency A			Agency B		
		Year One	Year Two	Year Three	Year One	Year Two	Year Three
Bed capacity ^b	33	62	62	62	72	96	96
Average daily census	30	44	47	41	84	85	85
Average length of stay	4.1 or 10.1	9.7	10.6	11.6	4.6	4.9	4.9
Admissions ^c	346	109	92	83	1,758	1,752	1,666
Economic costs							
Total annual		\$1,856,861	\$2,119,082	\$1,928,608	\$2,285,801	\$2,280,583	\$2,542,840
Weekly per client ^d	\$607 to \$919	\$809	\$865	\$902	\$522	\$515	\$574
Per treatment episode ^e	\$2,907 to \$11,260	\$7,851	\$9,166	\$10,465	\$2,401	\$2,521	\$2,828

Year One = fiscal year 2005-2006; Year Two = fiscal year 2006-2007; Year Three = fiscal year 2007-2008

^a Nation-wide data from National Survey of Substance Abuse Treatment Services for bed capacity, average daily census, and annual admissions; Treatment Episode Data Set Discharges of urban American Indians for length of stay (short term and long term programs, respectively); and French et al. (2008) for economic cost bands.

^b Agency A had licensed capacity and physical capacity of 62 beds for all years while Agency B had licensed capacity and physical capacity of 96 beds for all years except 2005 – 2006 when licensed capacity was 72 beds.

^c Admissions include “re-admissions” to the extended care component for Agency B.

^d Weekly economic cost per client = Total annual cost / Average weekly Census / 52.14 weeks.

^e Economic cost per treatment episode = Weekly economic cost per client x Average length of stay (weeks) where economic cost definitions are as per French, Salome, Sindelar, and McLellan (2002, page 444).

Numbers of clients per counselor for the study agencies were similar to (Agency A) or somewhat larger (Agency B) than in the national ADSS data for urban residential treatment programs (which had a mean of five and a median of four). Agency A had approximately five clients per counselor in fiscal year 2005-2006 while Agency B had eight clients per counselor at that time. Based on the ADSS data, Agency A was at the 67th percentile nationally for clients per counselor, while Agency B was at the 85th percentile.

Economic Costs for the Study Agencies

Using the administrative data, accounting costs were translated into the economic costs shown in Table 3. Whereas Agency A had weekly economic costs of approximately \$850 per client, the corresponding weekly figure for Agency B was \$550 per client. The treatment episode costs were approximately \$9,000 for Agency A and \$2,500 for Agency B.

These figures for the study agencies can be compared to the national “cost bands” provided by French et al. (2008) and shown in the left column of Table 3. For adult residential services, French et al. (2008) studied some 22 programs, which had an average length of stay of 13 weeks, with a median length of stay of 11 weeks.

In the national data, the inter-quartile range (cost band) for weekly economic cost per client ranged from \$607 to \$919 in 2006 U.S. dollars (French et al., 2008). The treatment episode cost band ranged from \$2,907 to \$11,260 in 2006 U.S. dollars.

Thus, the weekly economic costs for Agency A were well within the cost band based on national data. Similarly, the treatment episode costs for Agency A were as expected based on the studies by French et al. (2008). Conversely, Agency B had weekly costs notably below the cost band reported by French et al. (2008) and also had treatment episode costs lower than expected based on the national data.

Taking into account program size, the predicted mean weekly economic cost for Agency A was \$521, with a predicted third quartile cost of \$772. Over the study years, the observed weekly economic cost (\$850) for Agency A corresponded to a predicted 84th percentile. In other words, Agency A costs were toward the upper end of the predicted range, taking into account the average daily census. Conversely, for Agency B, the predicted mean weekly economic cost was \$548, which was essentially equal to the observed figure (\$550).

CONCLUSIONS

Contrary to the hypothesis, the study programs had costs similar to or lower than those for mainstream facilities. Whether measured per week or per treatment episode, one study agency had costs well within national cost bands, while the other study agency's costs were notably below the national figures.

One explanation for the low costs may be that the study agencies operated in environments with markedly limited financial resources. In an editorial, Roubideaux (2002) summarized the situation by saying "We also must help educate others, especially our country's leaders, on the severe levels of under-funding and lack of resources in the Indian health system and the need for more funding for Indian health care" (p. 1403). Conceivably, the study agencies may have used funds more efficiently than did mainstream programs with greater financial resources. Indeed, greater efficiency is also suggested by the finding that study agency clients had greater severity (shown, for example, by their unemployment levels) than did their national counterparts.

An additional explanation could be economies of scale. Namely, the study agencies were notably larger than the typical urban residential substance abuse treatment program. For example, the study agencies exceeded roughly 90% of urban residential programs with respect to numbers of beds and clients. French et al. (2008) and Woodward et al. (2008) pointed out that powerful determinants of costs include economies of scale as well as lengths of stay. Indeed, when adjustments were made to account for program size, the costs observed at the study agencies appeared close to those predicted from national data.

Staff mixtures may also explain costs. For example, one study agency made considerable use of residential aides rather than certified substance abuse treatment counselors (see "Residential substance abuse treatment for urban American Indians and Alaska Natives Part I: Services and staff," in this issue). And both study agencies exceeded national averages with regard to numbers of clients per full-time substance abuse treatment counselor. Therefore, some cost savings may be due to staff composition.

Strengths and limitations of the study should be recognized. The present project appears to be the first analysis addressing cost of services for urban AI/AN clients of residential treatment programs. McFarland et al. (2006) reported on the organization and financing of alcohol treatment programs for AI/ANs. But few, if any, studies have provided detailed

economic costs of health care services delivered to urban AI/ANs. This lack of information is especially unfortunate because urban individuals comprise most of the AI/AN population (Castor et al., 2006).

On the other hand, the project was limited to two urban AI/AN treatment programs. The study agencies may or may not be representative of other facilities focused on this population. However, demographics of the study agency clients were generally similar to those of their national counterparts, except that study clients were less likely to be employed. Also, as described in the companion paper (“Residential substance abuse treatment for urban American Indians and Alaska Natives Part I: Services and staff,” in this issue), the study programs illustrate notable variations in the types of services provided.

By design, the present report focused on costs. Thus, client data (including treatment outcomes) are not provided here (but will be described elsewhere). However, it should be noted that other projects have examined results of treatment for AI/ANs with substance abuse problems. For example, Evans et al. (2006) found similar reductions in problem severity one year after treatment entry for AI/AN versus non-Native clients in California. In addition, the American Society of Addiction Medicine has noted that “there is a dearth of guideline-based research from which to develop meaningful performance and outcomes measures for the addiction treatment field” (Addiction Specialist Physician Performance Panel, 2014, p. 28). These limitations notwithstanding, the present project showed that urban AI/ANs who have substance abuse problems can be served by residential treatment programs with modest budgets. This result is noteworthy because the study agencies provide numerous culturally specific as well as mainstream services (“Residential substance abuse treatment for urban American Indians and Alaska Natives Part I: Services and staff,” in this issue). In the words of Lillie-Blanton and Roubideaux (2005), this finding addresses “an important but often overlooked public policy issue—how to more effectively address the health care needs of this nation’s first citizens” (p. 759). Indeed, these results are especially pertinent for substance abuse treatment program developers and managers who recognize that “efforts to improve health care for American Indians and Alaska Natives need to be more culturally appropriate and community based and must help build community capacity” (Lillie-Blanton & Roubideaux, 2005, p. 760).

REFERENCES

- Addiction Specialist Physician Performance Panel. (2014). *The ASAM performance measures for the addiction specialist physician*. Chevy Chase, MD: American Society of Addiction Medicine. Retrieved from <http://www.asam.org/quality-practice/standards-and-performance-measures>
- Albrecht, J., Lindsay, B., & Terplan, M. (2011). Effect of waiting time on substance abuse treatment completion in pregnant women. *Journal of Substance Abuse Treatment, 41*, 71-77. <http://dx.doi.org/10.1016/j.jsat.2011.01.015>
- Alexandre, P. K., Beulaygue, I. C., French, M. T., McCollister, K. E., Popovici, I., & Sayed, B. A. (2012). The economic cost of substance abuse treatment in the state of Florida. *Evaluation Review, 36*, 167-185. <http://dx.doi.org/10.1177/0193841X12450164>
- Breusch, T. S., & Pagan, A. R. (1979). A simple test for heteroscedasticity and random coefficient variation. *Econometrica, 47*, 1287-1294. <http://www.jstor.org/stable/i332710>
- Caspi, Y., Turner, W. M., Panas, L., McCarty, D., & Gastfriend, D. R. (2001). The severity index: An indicator of alcohol and drug dependence using administrative data. *Alcoholism Treatment Quarterly, 19*, 49-64. http://dx.doi.org/10.1300/J020v19n04_03
- Castor, M. L., Smyser, M. S., Taualii, M. M., Park, A. N., Lawson, S. A., & Forquera, R. A. (2006). A nationwide population-based study identifying health disparities between American Indians/Alaska Natives and the general populations living in select urban counties. *American Journal of Public Health, 96*, 1478-1484. <http://dx.doi.org/10.2105/AJPH.2004.053942>
- Chong, J., & Lopez, D. (2007). Predictors of relapse for American Indian women after substance abuse treatment. *American Indian and Alaska Native Mental Health Research, 14*(3), 24-48. <http://dx.doi.org/10.5820/aian.1403.2007.24>
- Evans, E., Spear, S. E., Huang, Y., & Hser, Y. (2006). Outcomes of drug and alcohol treatment programs among American Indians in California. *American Journal of Public Health, 96*, 889-896. <http://dx.doi.org/10.2105/AJPH.2004.055871>
- French, M. T. (2002). *Drug Abuse Treatment Cost Analysis Program (DATCAP): Program version 8 user's manual*. Coral Gables, FL: University of Miami. Retrieved from <http://www.datcap.com/brief.htm>
- French, M. T., & Drummond, M. (2005). A research agenda for economic evaluation of substance abuse services. *Journal of Substance Abuse Treatment, 29*, 125-137. <http://dx.doi.org/10.1016/j.jsat.2005.05.009>

- French, M. T., Dunlap, L. J., Zarkin, G. A., McGeary, K. A., & McLellan, A. T. (1997). A structured instrument for estimating the economic cost of drug abuse treatment: The Drug Abuse Treatment Cost Analysis Program (DATCAP). *Journal of Substance Abuse Treatment, 14*, 445-455. [http://dx.doi.org/10.1016/S0740-5472\(97\)00132-3](http://dx.doi.org/10.1016/S0740-5472(97)00132-3)
- French, M. T., Popovici, I., & Tapsell, L. (2008). The economic costs of substance abuse treatment: updated estimates and cost bands for program assessment and reimbursement. *Journal of Substance Abuse Treatment, 35*, 462-469. <http://dx.doi.org/10.1016/j.jsat.2007.12.008>
- French, M. T., Roebuck, M. C., & McLellan, A. T. (2004). Cost estimation when time and resources are limited: The Brief DATCAP. *Journal of Substance Abuse Treatment, 27*, 187-193. <http://dx.doi.org/10.1016/j.jsat.2004.07.001>
- French, M. T., Salome, H. J., Sindelar, J. L., & McLellan, A. T. (2002). Benefit-cost analysis of addiction treatment: Methodological guidelines and empirical application using the DATCAP and ASI. *Health Services Research, 37*(2), 433-455. <http://dx.doi.org/10.1111/1475-6773.031>
- Indian Health Care Improvement Act, Pub. L. No. 94-437, 90 Stat. 1400 (1976).
- Legha, R. K., & Novins, D. (2012). The role of culture in substance abuse treatment programs for American Indian and Alaska Native communities. *Psychiatric Services, 63*, 686-692. <http://dx.doi.org/10.1176/appi.ps.201100399>
- Lillie-Blanton, M., & Roubideaux, Y. (2005). Understanding and addressing the health care needs of American Indians and Alaska Natives. *American Journal of Public Health, 95*, 759-761. <http://dx.doi.org/10.2105/AJPH.2005.063230>
- McCamant, L. E., Zani, B. G., McFarland, B. H., & Gabriel, R. M. (2007). Prospective validation of substance abuse severity measures from administrative data. *Drug and Alcohol Dependence, 86*, 37-45. <http://dx.doi.org/10.1016/j.drugalcdep.2006.04.016>
- McFarland, B. H., Gabriel, R. M., Bigelow, D. A., & Walker, R. D. (2006). Organization and financing of alcohol and substance abuse programs for American Indians and Alaska Natives. *American Journal of Public Health, 96*, 1469-1477. <http://dx.doi.org/10.2105/AJPH.2004.050575>
- Mutter, R., Ali, M. M., Smith, K., & Strashny, A. (2015). Factors associated with substance use treatment completion in residential facilities. *Drug and Alcohol Dependence, 154*, 291-295. <http://dx.doi.org/10.1016/j.drugalcdep.2015.07.004>
- Reif, S., Horgan, C. M., & Ritter, G. A. (2011). Treatment services: Triangulation of methods when there is no gold standard. *Substance Use & Misuse, 46*, 620-632. <http://dx.doi.org/10.3109/10826084.2010.528119>

- Roebuck, M. C., French, M. T., & McClellan, A. T. (2003). DATStats: Results from 85 studies using the Drug Abuse Treatment Cost Analysis Program. *Journal of Substance Abuse Treatment*, 25, 51-57. [http://dx.doi.org/10.1016/S0740-5472\(03\)00067-9](http://dx.doi.org/10.1016/S0740-5472(03)00067-9)
- Rosopa, P. J., Schaffer, M. M., & Schroeder, A. N. (2013): Managing heteroscedasticity in general linear models. *Psychological Methods*, 18, 335-351. <http://dx.doi.org/10.1037/a0032553>
- Roubideaux, Y. (2002). Perspectives on American Indian health. *American Journal of Public Health*, 92, 1401-1403. <http://ajph.aphapublications.org/toc/ajph/92/9>
- Saylor, K. (2003). The Women's Circle comes full circle. *Journal of Psychoactive Drugs*, 35, 59-62. <http://dx.doi.org/10.1080/02791072.2003.10399994>
- Stahler, G. J., Mennis, J., & DuCette, J. P. (2016). Residential and outpatient treatment completion for substance use disorders in the U.S.: Moderation analysis by demographics and drug of choice. *Addictive Behaviors*, 58, 129-135. <http://dx.doi.org/10.1016/j.addbeh.2016.02.030>
- Substance Abuse and Mental Health Services Administration, Office of Applied Studies. (2003). *The ADSS Cost Study: Costs of substance abuse treatment in the specialty sector* (DHHS Publication No. SMA 03-3762, Analytic Series A-20). Rockville, MD: Authors. Retrieved from <http://www.dldocs.stir.ac.uk/documents/adsscosts.pdf>
- Substance Abuse and Mental Health Services Administration, Office of Applied Studies. (2007). *National Survey of Substance Abuse Treatment Services (N-SSATS): 2006. Data on substance abuse treatment facilities* (DHHS Publication No. SMA 07-4296). Rockville, MD: Authors. Retrieved from http://www.dasis.samhsa.gov/dasis2/nssats/2006_nssats_rpt.pdf
- Terplan, M., Smith, E. J., Kozloski, M. J., & Pollack, H. A. (2010). "Compassionate coercion": Factors associated with court-mandated drug and alcohol treatment in pregnancy 1994-2005. *Journal of Addiction Medicine*, 4, 147-152. <http://dx.doi.org/10.1097/ADM.0b013e3181b562dc>
- Woodward, A., Das, A., Raskin, I. E., & Morgan-Lopez, A. A. (2006). An exploratory analysis of treatment completion and client and organizational factors using hierarchical linear modeling. *Evaluation and Program Planning*, 29, 335-351. <http://dx.doi.org/10.1016/j.evalprogplan.2006.08.005>
- Woodward, A. M., Raskin, I. E., & Blacklow, B. (2008). A profile of the substance abuse treatment industry: Organization, costs, and treatment completion. *Substance Use & Misuse*, 42, 647-679. <http://dx.doi.org/10.1080/10826080601096640>

Wright, S., Nebelkopf, E., King, J., Maas, M., Patel, C., & Samuel, S. (2011). Holistic system of care: Evidence of effectiveness. *Substance Use & Misuse*, 46, 1420–1430. <http://dx.doi.org/10.3109/10826084.2011.592438>

ACKNOWLEDGEMENTS

This work was supported by the National Institute on Alcohol Abuse and Alcoholism (NIAAA), grant number R01 AA01 13806.

AUTHOR INFORMATION

Dr. Bentson H. McFarland is professor emeritus of Psychiatry, Public Health and Preventive Medicine at Oregon Health & Science University in Portland, Oregon.

Dr. R. Dale Walker is professor emeritus of Psychiatry, Public Health and Preventive Medicine at Oregon Health & Science University in Portland, Oregon.

Dr. Patricia Silk-Walker (deceased) was an assistant professor of Public Health and Preventive Medicine at Oregon Health & Science University in Portland, Oregon.