SERVICE UTILIZATION, EXPENDITURES, AND PROGRAM SUCCESS

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Introduction

A major challenge in the implementation of systems of care is creating mechanisms to pay for services that are provided across social services systems and by multiple agencies. Indeed, many have argued that the categorical funding structure in health and social services for youth and families is proving to be a major impediment to the integration of services. Because managed care often introduces pressures to reduce service expenditures and may negatively impact the quality and outcomes of care (Wholey & Burns 2000), we examined the relationship among patterns of service utilization, the expenditures of care, and the likelihood that youth and their families successfully met the clinical objectives that were established when they enrolled in the program.

Methods

Services and Expenditures Information. The information on the services received by each young person and the expenditure of those services was obtained from the Dawn Project's information management system, The Clinical Manager (TCM). The data reflect only those services that were paid for directly by the Dawn Project. Because the Dawn Project coordinates a large array of services, services were collapsed into eight categories: mental/behavioral health, physical health, crisis/respite, foster care placement, residential/community residential placement, mentoring services, discretionary funds, and service coordination (see Table 1). In order to aid analysis, a series of dummy variables was created to indicate whether a young person received each type of service. The comprehensiveness of a young person's service array was measured by summing the service indicator variables ($M = 4.75$, $SD = 1.58$). Finally, we computed the total amount spent on services for each youth. Because this variable was highly skewed, we also used the natural log of the actual expenditure in multivariate models.

Program Disposition. The outcome for each young person's enrollment was obtained from TCM. The outcomes for the present analysis were collapsed into two categories: discharged having met treatment goals (i.e., successful discharge from the program) and discharged for all other reasons (i.e., failure to make sufficient clinical progress, aging out).

Analysis. First, OLS regression was used to examine the impact of demographic characteristics, diagnosis, referral source, level of functioning at enrollment and services received on a young person's overall expenditures. Second, OLS regression was used to examine the impact of demographic characteristics, diagnosis, referral source, and level of functioning at enrollment on a young person's expenditures within each service category. Third, logistic regression was used to model the effect of individual-level, service, and expenditure factors on the likelihood of successfully completing the program. Fourth, a cluster analysis was conducted

on the service data to determine the most commonly used service patterns within the Dawn Project. Because CAFAS data were not available for all 788 young people, the OLS and logistic regressions were completed using the service data of those young people with CAFAS data at enrollment (n = 566).

Results

Analysis of Service Usage. In comparing service categories to one another, it was found that the most widely used service was the provision of discretionary funds. Nearly 98.0% of young people discharged from the Dawn Project had received discretionary dollars, which could be used to pay for nontraditional services. On average, each of the young people that received discretionary monies received approximately $2,605. Mental and behavioral health services were the second most commonly used services. Over 68.0% of young people discharged from the Dawn Project had received some form of mental health treatment with an average cost of $5,980 per young person. The third most frequently used service was mentoring. Approximately 62.0% of young people in the sample were provided with some type of mentoring. Mentoring services cost, on average, $11,927 per youth. Residential treatment services were used by just over 50.0% of the young people discharged from the Dawn Project. On average, $58,200 was spent for each youth who received residentially-based services. Less than 50.0% of the study sample received crisis/respite services, foster care services, or physical health services (see Table 1 for details).

Table 1. Descriptive statistics for service and expenditure variables.

Service Categories	Number who received service	Percent who received service	Amount spent on those who received service	
	N	*%*	*M*	*SD*
Mental/Behavioral health	542	68.78	$5,980	$8,232
Physical health	155	19.67	$274	$467
Crisis/respite	325	41.24	$5,199	$12,955
Foster care	269	34.14	$20,236	$21,563
Residential/Community residential	402	51.02	$58,200	$63,259
Mentoring	492	62.44	$11,927	$19,729
Discretionary funds	772	97.96	$2,605	$4,414

Cluster Analysis of Services. Hierarchical and K-means cluster analysis was completed on all available service data. The results of the cluster analysis indicated that a six, seven, or eight cluster solution would adequately describe the data. Based upon inspection of each solution, it was determined that the seven cluster solution was the best fit for the data. Table 2 provides the image and identity matrix for the seven cluster solution. Because service coordination is provided to all young people, the differences between the clusters are due to the use of the remaining service categories. As seen in Table 2, the groupings of services provided to young people range from low intensity service mix, such as providing only discretionary funds (Cluster 6), to a high intensity service mix such as Cluster 5, which includes all services except foster care.

Multinomial logistic regression was used to determine which variables predicted membership in each cluster. When compared to service cluster five, young people in service

cluster one were more likely to have a mood-related disorder. When compared to service cluster five, young people in service cluster two were more likely to be male and less likely to have been referred by child welfare, juvenile justice, or education rather than mental health. Young people in service cluster three were less likely to have been referred from child welfare, juvenile justice, or education rather than mental health. Young people in service cluster three were more likely to have a mood-related disorder when compared to those young people in service cluster five. When compared to young people in service cluster five, young people in service cluster four were younger at enrollment. Young people in cluster four were less likely than those in cluster five to have entered the Dawn Project through child welfare, juvenile justice, or education. Additionally, when compared to young people in cluster five, young people in service cluster four were more likely to have either an impulse-related disorder or a mood-related disorder. The young people placed in service cluster six, when compared with those in service cluster five were more likely to be African-American, less likely to have come from child welfare, juvenile justice, or education rather than mental health, and more likely to have a mood-related disorder. Finally, when compared to young people in cluster five, young people in cluster seven were more likely to be male, less likely to have been enrolled in the Dawn Project by child welfare, juvenile justice, or education, and more likely to have a mood-related disorder.

Table 2. Image and identity matrix for seven cluster solution.

	Cluster 1 (n = 105)	Cluster 2 (n = 144)	Cluster 3 (n = 99)	Cluster 4 (n = 100)	Cluster 5 (n = 120)	Cluster 6 (n = 139)	Cluster 7 (n = 81)
Mental/Behavioral health	1.00	.97	1.00	.95	.86	.00	.00
Physical health	.00	1.00	.00	.00	.00	.05	.05
Crisis/respite	.00	.64	.00	.84	1.00	.16	.09
Foster care	.30	.40	.04	.49	.70	.22	.16
Residential treatment	1.00	.65	.00	.00	1.00	.43	.28
Mentoring	.58	.85	.62	.78	.74	.00	1.00
Discretionary funds	1.00	1.00	.94	1.00	1.00	.95	.96
	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6	Cluster 7
Mental/Behavioral health	1	1	1	1	1	0	0
Physical health	0	1	0	0	0	0	0
Crisis/respite	0	1	0	1	1	0	0
Foster care	0	0	0	0	1	0	0
Residential treatment	1	1	0	0	1	0	0
Mentoring	1	1	1	1	1	0	1
Discretionary funds	1	1	1	1	1	1	1
Expenditures per Cluster							
M	$59,893	$81,051	$16,431	$40,008	$118,040	$24,219	$27,728
SD	$43,689	$73,608	$22,440	$42,765	$116,847	$40,798	$32,765

Service Expenditures. Four variables significantly predicted expenditures: length of enrollment, referral source, level of functioning at enrollment and service category received. Young people with longer lengths of stay in the Dawn Project had higher expenditures. When compared to young people referred from mental health, young people referred from education had higher expenditures. Young people with higher levels of impairment at enrollment had higher expenditures. Receiving mental or behavioral health services, foster care services,

residential treatment, mentoring services, or discretionary funds predicted higher expenditures (see Table 3).

Table 3. Predictors of expenditures in the Dawn Project.

Predictor	*b*	*t*
Race	-.08	-1.02
Gender	-.06	-0.62
Age at enrollment	.01	-0.35
Length of enrollment	.06	9.19***
Referral Source		
Child Welfare	.30	1.43
Juvenile Justice	.13	0.63
Education	.51	2.50*
Diagnostic Categories		
Impulse-Related disorders	-.06	-0.22
Mood-Related disorders	-.04	-0.14
Total CAFAS score at enrollment	.00	3.35***
Service Categories		
Mental/Behavioral health	.57	5.97***
Physical health	-.01	-0.10
Crisis/respite	.09	1.01
Foster care	.56	5.24***
Residential/Community residential	1.47	15.61***
Mentoring	.51	5.52***
Discretionary funds	1.78	6.09***

[1]Mental Health served as the comparison category

*$p \leq .05$. ***$p \leq .001$.

When predicting expenditures within individual service categories, it was found that, with the exception of physical health, length of enrollment is predictive of increased expenditures. Additional demographic, referral source, or clinical characteristics predicted expenditures for physical health services, foster care services, residential treatment services, and mentoring services. When compared to young people referred from mental health, young people referred to the Dawn Project from juvenile justice or child welfare have lower physical health-related expenditures. In addition, younger children who receive foster care have higher expenditures than do older children who receive foster care. When compared to young people referred from mental health and who received foster care services, young people referred from child welfare, juvenile justice, or education who received foster care services had higher foster care-related expenditures. When compared to young people in the other diagnosis category who received foster care, young people who had a diagnosis in either the impulse-related category or mood-related category who received foster care had higher foster care-related expenditures. Being older at enrollment into the Dawn Project was predictive of higher residential treatment expenditures. When compared to young people from mental health, young people referred to the Dawn Project from either child welfare or juvenile justice had higher residential treatment expenditures. Young people who entered the Dawn Project with more significant levels of impairment had higher residential treatment-related expenditures. Finally, being male predicted

increased expenditures among the young people who received mentoring. A higher level of overall impairment in functioning at enrollment was also predictive of increased mentoring expenditures (see Table 4).

Outcome Analyses. In terms of outcomes, the majority of youth (63.6%) left the program having successfully achieved the CFT's treatment goals. Several variables predicted successful outcome. Young people who are younger at enrollment in the Dawn Project are more likely to leave the program having met their treatment goals. Youth who are Caucasian are more likely to leave the Dawn Project having met their CFT goals. When compared with mental health, young people entering the Dawn Project from child welfare are more likely to be discharged having met their treatment goals. Youth who have better functioning at enrollment are more likely to be discharged having met their CFT treatment goals. Crisis/respite services were associated with a lower likelihood of meeting treatment goals as well as receiving residential/community residential treatment. Additionally, the total expenditure of services is also statistically related to the likelihood of success in the program; however, the overall impact is small in terms of magnitude and varies slightly depending on whether we use the actual expenditures or the logged expenditures to estimate the effect of expenditures (see Table 5). In the model for actual expenditures, for example, the coefficient for total expenditures is negative but very small, suggesting that higher expenditures decrease slightly the likelihood of success associated with a lower likelihood of success. However, when we control for the extreme values at the high end of the distribution by using a logged transformation of expenditures, the coefficient for total expenditures in this model is significant but slightly positive. Because of the differences in the direction of the coefficients in these models, we tested for the possibility of a curvilinear effect of expenditures. These results suggest that overall there is a slight decrease in the probability of success for high expenditure youth (over $75,000). Regardless of expenditures, the probability of success never dropped below 60%. In short, the expenditures have only a minimal effect on the probability of success of individual youth this effect is limited to the high end of the distribution of expenditures.

A similar analysis of outcomes was completed substituting the individual service variables with the service cluster variables. Young people who were Caucasian were more likely to complete the Dawn Project by meeting their team's goals. Participants who were younger at the time of enrollment were more likely to leave the Dawn Project by meeting accomplishing their CFT goals. Young people with better levels of functioning at enrollment were more likely to be discharged from the Dawn Project after meeting their treatment goals. When compared to young people in cluster five, young people in cluster seven were more likely to leave the Dawn Project by completing their CFT goals. Finally, the same slight, but significant, curvilinear relationship was noted with the probability of leaving the Dawn Project by meeting team goals declining slightly as expenditures reach $75,000.

Table 4. Predictors of expenditures in the Dawn Project by service category

Predictor	Mental/ Behavioral Health		Physical Health		Crisis/Respite		Foster Care	
	b	t	*b*	t	*b*	t	*b*	t
Race	.12	0.82	-.26	-1.19	-.22	-1.08	.20	1.04
Gender	.07	0.42	-.17	-0.57	.25	1.03	-.02	-0.13
Age at enrollment	-.03	-0.98	.07	1.32	-.08	-1.77	-.11	-3.12**
Length of enrollment	.02	2.60**	.02	1.70	.05	4.34***	.06	5.81***
Referral Source[1]								
Child Welfare	.17	0.44	-1.28	-2.73**	.56	1.40	4.27	3.61***
Juvenile Justice	.07	0.17	-1.05	-2.34*	.71	1.74	4.13	3.48***
Education	.55	1.30	-.63	-1.30	.62	1.36	3.16	2.20*
Diagnostic Categories[2]								
Impulse-related	.96	1.47	-.48	-0.42	.45	0.51	3.50	2.93**
Mood-related	.73	1.08	-.84	-0.69	-.21	-0.23	3.72	3.09**
Total CAFAS at enrollment	.00	1.38	.00	1.30	-.00	-0.10	-.00	-0.55

Predictor	Residential		Mentoring		Discretionary Funds	
	b	*t*	*b*	*t*	*b*	*t*
Race	-.17	-1.38	.10	0.65	.09	0.78
Gender	-.01	-0.06	-.52	-2.62**	.02	0.18
Age at enrollment	.06	2.13*	-.01	-0.21	-.03	-1.53
Length of enrollment	.05	7.87***	.07	6.64***	.08	11.39***
Referral Source[1]						
Child Welfare	1.15	4.30***	-.71	-1.82	-.47	-1.68
Juvenile Justice	.85	3.12**	-.56	-1.43	-.16	-0.56
Education	--	--	.75	1.88	-.07	-0.24
Diagnostic Categories[2]						
Impulse-related	.49	.45	-.38	-0.45	.08	0.17
Mood-related	.37	.47	-.59	-0.68	.15	0.33
Total CAFAS at enrollment	.01	.001***	.01	4.28***	-.00	-0.01

[1]Mental Health served as the comparison category
[2]Other Disorders served as the comparison category
*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$

Table 5. Predictors of successful completion of the Dawn Project.

Predictor	Raw Total Expenditure *O.R.*	Log Total Expenditure *O.R.*
Race	0.61*	0.61*
Gender	0.91	0.92
Age at enrollment	0.87**	0.86***
Length of enrollment	1.11***	1.10***
Referral Source[1]		
Child Welfare	2.86*	2.85*
Juvenile Justice	1.19	1.21
Education	0.67	0.61
Diagnostic Categories[2]		
Impulse-related	2.33	2.43
Mood-related	2.64	2.71
CAFAS score at enrollment	0.99**	0.99**
Service Categories		
Mental/Behavioral health	0.86	0.75
Physical health	0.64	0.63
Crisis/respite	0.59*	0.57*
Foster care	0.68	0.62
Residential/Community residential	0.49**	0.36**
Mentoring	0.76	0.66
Discretionary funds	2.67	1.37
Total Expenditures	1.00*	3.66*
Sq. of Total Expenditures	1.00	0.93*
$\chi 2$ = 105.90***		
Nagelkerke R^2 = 0.14		

[1]Mental Health served as the comparison category
[2]Other Disorders served as the comparison category
*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

Conclusions

In conclusion, our findings suggest that a managed care approach can be used effectively without compromising clinical care. As in most systems of care, residential care is the most expensive form of care, and, perhaps more importantly, it is associated with a somewhat lower probability of clinical success. However, within the Dawn Project, there is considerable heterogeneity in the array of services youth receive indicating that the needs of the individual youth are largely dictating what services are provided. In this regard, we believe that managed care is not an impediment to achieving the individualized treatment approach emphasized in the system of care philosophy (Stroul & Friedman, 1996).

Our finding that the level of expenditure is less important than the type of care in predicting success is especially intriguing. However, we believe this preliminary finding must be interpreted with caution given the complex nature of the data. Indeed, our analyses do not yield a clear picture as to the appropriate amount to spend on a youth to achieve a positive outcome. Rather, we believe our findings suggest that CFTs take great care in recommending services that are appropriate for a particular client's needs and, as a result, the money is more effectively tailored to the individual needs of the youth. More important, coupling the coordination of services and the authority to pay for services insures a more targeted delivery of service dollars focused where they are needed. In the coming months, as we continue to analyze these data, we hope to apply more sophisticated methodologies to better understand the link between expenditures and program outcomes. Nevertheless, we believe these preliminary data underline the potential value of combining principles of managed care with the system of care philosophy.

References

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