

YOUTH OUTCOMES FOLLOWING FAMILY CENTERED TREATMENT® IN MARYLAND



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EXECUTIVE SUMMARY

Family Centered Treatment® (FCT) is among the practices used in Maryland to reduce out-of-home placements for youth involved with the juvenile justice system. FCT provides services in youths' home communities, within their families. Previous research has supported the effectiveness of FCT, and it appears in three registries of promising or effective programs for youth and families. The current project represents a larger, independently led study of the intervention. The following report summarizes findings from an external evaluation of FCT, with a focus on outcomes, cost, and program elements.

Highlights from Findings

Utilization

- The study includes a total of 1,246 youth who started FCT between fiscal years 2009 and 2013.
- Most youth admitted to FCT during the study period were between the ages of 15 and 17 years old (75%), and the average age at admission just over 16 years old. The majority of youth were male and African American/Black.
- Fidelity to the FCT practice model was high, with average fidelity to specified treatment activities exceeding 75% in fiscal years 2011-2013 (the years in which fidelity data was consistently captured in client records). Over 85% of the sample met FCT's definition of engaged in treatment (11 or more direct contacts).
- Fidelity and engagement in treatment were not significantly related to justice system outcomes, but dosage as measured by length of treatment was significant in most models of later outcomes. Longer FCT treatment spells were associated with decreased odds of juvenile adjudication, adult conviction, and adult incarceration.

Costs

- With shorter lengths of stay and a lower daily cost, the initial intervention cost for FCT was \$30,170 less per youth than group home placement for a statistically equivalent comparison group, on average.
- Accounting for initial intervention costs and any additional residential placement costs during the first 12 months after the start of each intervention, FCT costs were an estimated \$41,729 less per youth, on average, for the FCT group as compared with the control group, who were placed in group homes. From 12 to 24 months post-admission, costs were \$20,339 lower on average for FCT youth.

Outcomes

- Relative to a statistically equivalent comparison group of youth who received group care, youth participating in FCT were significantly less likely to be committed in the juvenile justice system and to experience arrest resulting in conviction or sentences of incarceration in the criminal justice system.
- No significant difference was found between youth receiving FCT and group care on re-adjudication in the juvenile justice system.
- Among a matched subsample of youth ages 16 and over at initiation of treatment, FCT participants were significantly less likely to experience adult arrest leading to conviction or a sentence of incarceration than youth served in group care.
- Analysis of a matched female subsample showed non-significant differences between FCT participants and group care participants; relatively few female youth experienced the outcomes evaluated in the current research.

Introduction

Purpose of this Report

As juvenile justice service options expand, research on effectiveness is also required to inform system decision-making. This report describes the first known external evaluation of Family Centered Treatment (FCT), an intensive intervention delivered in the community to youth and families with juvenile justice involvement. Unlike laboratory-developed interventions, FCT was initiated by practitioners and is widely available, and this effectiveness study is based on a large sample over a period of several years. Key characteristics of FCT include the family as the focus of intervention, intensive service provision, and connection with community resources. FCT is unique in its “no reject/no eject” policy, serving youth regardless of risk factors or severity of offending behavior. In other words, FCT applies no exclusionary criteria, other than that each youth must have a parent or caregiver who will be part of treatment.

The University of Maryland School of Social Work (SSW) collaborated with the Institute for Family Centered Services (IFCS) and the Maryland Departments of Juvenile Services (DJS) and Public Safety and Correctional Services (DPSCS) to acquire relevant data to produce this report, with funding from the MENTOR Network. FCT is used with juvenile court-involved youth and families in Maryland (and other states) with the goals of improving outcomes for youth and families and reducing the use of out-of-home placements.

This report provides a summary of analyses of FCT and system data. The primary purpose of this research was to investigate outcomes following FCT. Specific study aims were as follows:

- 1) to compare recidivism rates (adjudication/conviction and commitment/incarceration) among DJS-referred youth who participated in FCT with a matched sample of youth placed in congregate care;
- 2) to compare costs of service provision between FCT and congregate care; and
- 3) to explore the association between implementation factors (engagement, dosage and fidelity) and youth-level outcomes.

Sub-groups of youth, specifically female youth and older youth, were analyzed separately in order to investigate program effectiveness for these groups.

What is Family Centered Treatment®?

Family Centered Treatment (FCT) has existed as a practice model since 1998, but it has evolved over that period of time (familycenteredtreatment.com). Key characteristics of FCT include the family (rather than just the youth) as the focus of intervention, intensive service provision, and connection with community resources. The theoretical and program components of FCT are derived from Eco-Structural Family Therapy and Emotionally Focused Therapy (familycenteredtreatment.com).

FCT originates from practitioners’ attempts to provide a practical approach to work with families at risk for disruption following family and environmental challenges, as well as youth delinquency. The primary focus is on family strengths, resources, and goals. FCT has been provided to families with child welfare, mental health, substance use, developmental disabilities, juvenile justice, and “crossover” (child welfare to juvenile justice) involvement (California Evidence-Based Clearinghouse for Child Welfare, 2006-2015).

As studied in the current evaluation, FCT is a short-term, family-focused treatment program for youth who are involved in the juvenile justice system and their families. The treatment model includes four phases: 1) joining and assessment, 2) restructuring (including individual or family trauma treatment, when indicated through assessment), 3) value changes, and 4) generalization. Services provided by FCT include not only counseling but skills training, treatment for trauma, coordination of community resources, and wraparound services. On

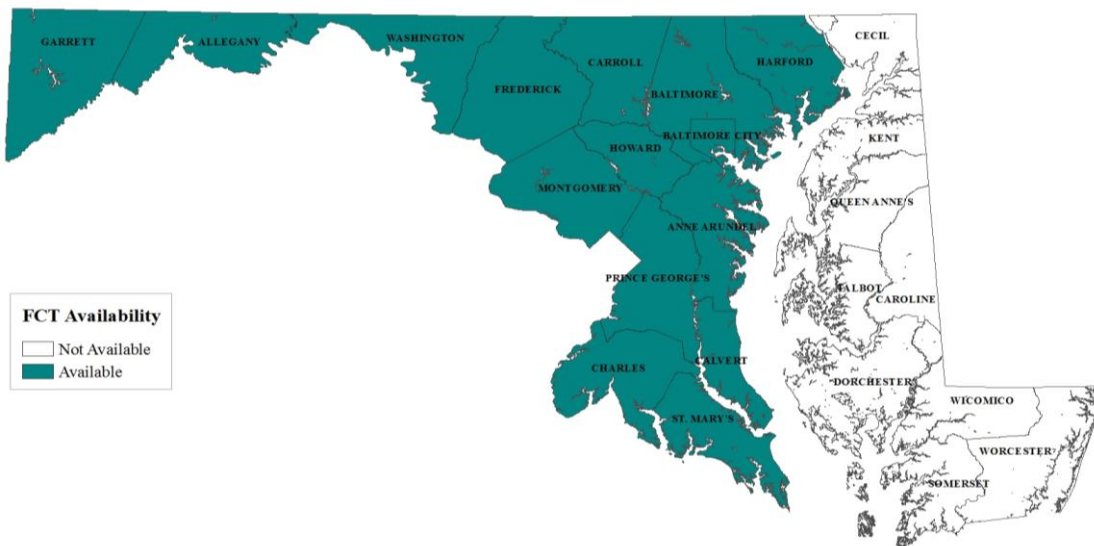
average, treatment lasts six months and is typically delivered in the family’s home or in other community settings via multiple weekly sessions. FCT is distinct from other practices in its intensive training, supervision, and management system. An FCT provider spends an average of five hours each week in peer and individual supervision. FCT considers the following elements essential to service provision: on-call support from the family’s own clinician, multiple staff involved at critical transitions, and collaborative work with all stakeholders on a weekly or even daily basis (California Evidence-Based Clearinghouse for Child Welfare, 2006-2015).

Efficacy of FCT was not established in controlled, laboratory settings; therefore, it may be considered a homegrown, or provider-developed, model of practice (Lipsey, 2012). FCT is unique in its “no reject/no eject” policy, serving juvenile court-involved youth with many different sets of risk factors, so long as a parent or caregiver is available to participate. Preliminary evaluations of FCT have documented cost savings compared with other evidence-based treatment models and reductions in out-of-home placements in a two-year period following treatment (Sullivan et al., 2012). FCT is considered a promising practice, according to the California Evidence-Based Clearinghouse for Child Welfare (2006-2015) and the Office of Juvenile Justice and Delinquency Prevention (to treat children exposed to violence; U. S. Department of Justice, n. d.). It is also listed in the Substance Abuse and Mental Health Services Administration’s National Registry of Evidence-Based Programs and Practices (2014).

FCT in Maryland

Since 2004, the Institute for Family Centered Services (IFCS) has provided FCT for Maryland DJS clients. FCT began in Maryland at the request of DJS, intended to prevent out-of-home placements among DJS youth. To date, over 2,200 youth have received FCT in Maryland. From FY09 through FY13, the time period covered in this report, FCT was administered by IFCS in every Maryland jurisdiction¹ except for the nine counties of the Eastern Shore (Figure 1). Currently, FCT is available throughout the state of Maryland.

Figure 1. FCT Availability in Maryland, FY09-FY13



¹ Jurisdictions refer to all Maryland counties and Baltimore City.

Assessing Family Centered Treatment

Data Sources

The data and findings presented in this report were drawn primarily from individual-level data routinely collected by a number of sources. Data came from IFCS (for FCT program and some youth-level information), DJS (for youth-level information, some program data, and juvenile justice outcomes), and DPSCS (for adult criminal justice outcomes). The eligible sample consisted of youth who had been adjudicated delinquent in Maryland and, following adjudication, were either served by FCT or in congregate care facilities. Facilities designated “group homes” or “treatment group homes” were selected as the facilities serving the most similar youth to FCT (as compared with, for example, hardware-secure facilities, emergency shelters, and inpatient mental health and substance abuse treatment facilities). Youth initiated services between July 1, 2008, and June 30, 2013. Analyses included follow-up data through June 30, 2014.

Three main categories of data were of particular interest to the study – outcomes, cost, and program data.

- **Outcome data** allow for the assessment of FCT, relative to group care, in its results for youth. The outcomes of particular interest for this study were *re-adjudication/conviction* and *commitment/incarceration*. Outcomes include *whether* and *when* youth in the study sample experienced additional justice system involvement in either the juvenile or adult justice systems in Maryland.
- **Cost data** were gathered and estimated in order to evaluate the relative expenses incurred by both FCT and group care provided through DJS.
- **Program data** include elements of service delivery and program implementation. Program data are comprised of markers of fidelity (the degree to which program elements have been delivered), dosage (length of service), and engagement in treatment (measured according to number of contacts between provider and youth/family).

For all three categories, matching across multiple data sources was conducted. Databases were combined based on a youth-level system identifier and additional identifying information (name, date of birth, gender, and race). Matching the data from FCT, DJS, and DPSCS sources allowed for analysis of justice system outcomes over time, as well as demographics, prior delinquency and juvenile court history, and length of service in FCT or group care. Program data matching allowed for combining program elements provided by FCT with outcomes provided by DJS and DPSCS.

Propensity Score Matching

Of critical importance to the current project is the application of propensity score matching (PSM). This is a technique used to create statistically equivalent, or “matching,” groups when random assignment cannot be conducted. In this case, PSM was used to create balance, or equivalence, between a group of youth who received FCT in fiscal years 2009-2013 and a group of youth who received services in group homes or treatment group homes during the same period of time. All had Maryland DJS involvement, and all had been adjudicated delinquent prior to beginning services. The samples were matched using the following covariates: age at admission, gender, race (White or Nonwhite), location of youth’s residence (urban, suburban or rural/large town), any prior adjudication for a violent offense, any prior committed placement through the juvenile court, number of prior delinquency complaints, age at first delinquency complaint, and number of prior committed placements. Following matching, the two samples were balanced in that none of these matching covariates were statistically significant. Unless otherwise indicated, all analyses were conducted on matched groups constructed using nearest neighbor one-to-one matching with replacement.

Analyses

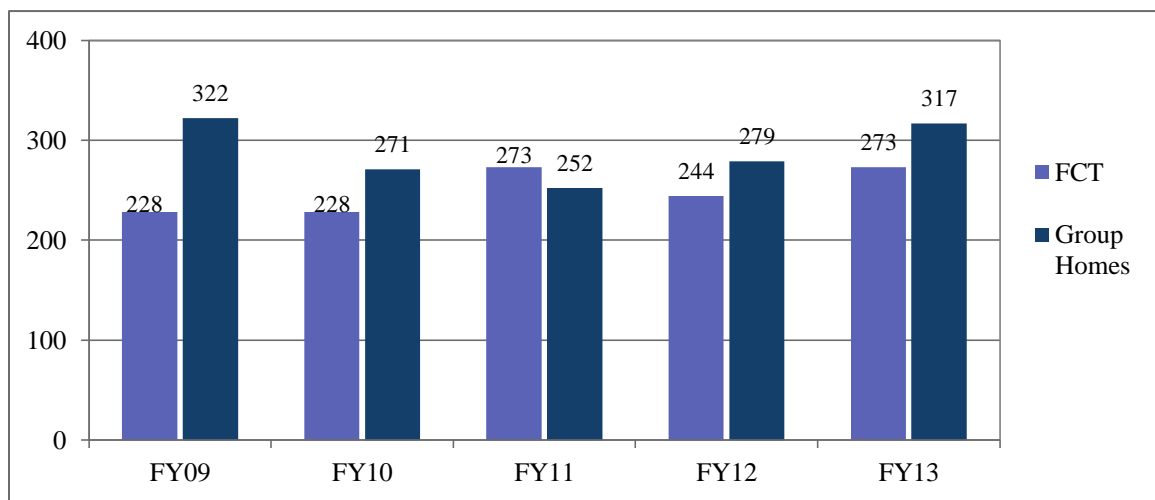
Multiple types of data analysis were employed throughout this project. Descriptive and bivariate analyses (e.g., chi-squares and t-tests) allowed for characterization of the sample and assessment of baseline differences between the FCT recipients and the comparison group, who received group care. Propensity score matching, in the Stata software package, was used to create statistically equivalent groups between FCT recipients and those receiving group care. Cox proportional hazards models (survival analyses) and logistic regression were conducted to analyze data on comparative recidivism/re-arrest and commitment/incarceration. Logistic regression models were conducted in one-group (FCT-only) analyses to predict odds of juvenile and adult outcomes following FCT services, based on service-level variables. Multiple regression models were developed to conduct the cost analyses.

Comparative Outcome Analysis

Sample Characteristics

The study included a total of 1,246 youth who started FCT between fiscal years 2009 and 2013. For purposes of outcome comparison, youth in FCT were matched to a sample of 1,441 youth who were admitted to a group home (GH) or treatment group home (TGH) between FY09 and FY13 (Figure 2). As described in the introduction, propensity score matching was used to create statistically equivalent groups for comparison. This section provides information on the FCT sample and the group home comparison sample.

Figure 2. Number of Study Sample Youth Admitted to FCT and Group Homes, FY09-FY13



As a result of the propensity score matching, the two samples (FCT and group home samples) were demographically similar. Because the group home sample was matched to the FCT sample, we highlight the FCT group's characteristics. See Figure 3 for more detail on each group.

Most youth admitted to FCT during the study period were between the ages of 15 and 17 years old (75%), and the average age at admission was just over 16 years old. All youth were between the ages of 10 and 20 years old. The majority of youth were male and African American/Black. The characteristics of youth who started FCT remained relatively stable over the five years of the study period. The largest share of youth resided in suburban jurisdictions, followed by rural and urban settings.

Figure 3. Demographic Characteristics of Matched Sample, Youth Admitted to FCT and Group Homes, FY09-FY13

	FCT	Group Homes
Total	1246	1441
Female	21%	25%
Male	79%	75%
African American/Black	67%	71%
Caucasian/White	27%	23%
Hispanic/Latino	5%	5%
Other	1%	1%
Mean Age (SD)	16.6 (1.4)	16.4 (1.3)
Urban	13%	24%
Suburban	53%	44%
Large Town/Rural	34%	31%

DJS administrative data were used to describe previous involvement with the juvenile justice system (Figure 4). On average, youth admitted to group homes had a slightly higher number of prior complaints to DJS ($\bar{x} = 6.7$) than did those who started FCT ($\bar{x} = 5.3$). For both youth who started FCT and those admitted to group homes, the first complaint to DJS typically occurred prior to the age of 14. Slightly more than one-third (36%) of youth who started FCT, and 44% of youth admitted to group homes, had at least one prior committed residential placement with DJS, and, for both groups, this subset of youth averaged 1.7 prior placements. Because these groups were matched using propensity score matching (nearest-neighbor, with replacement), differences between groups were non-significant.

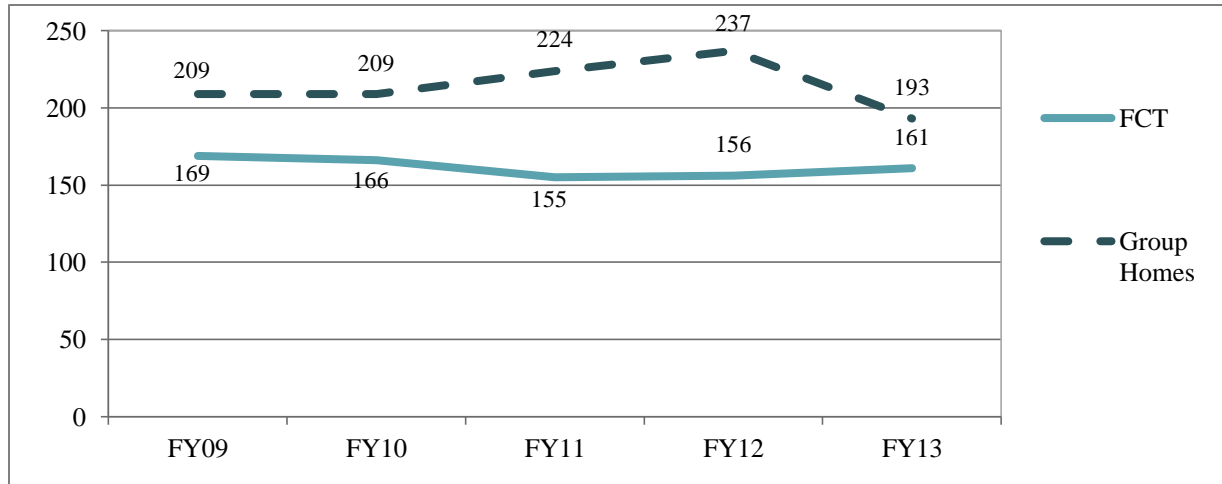
Figure 4. Prior DJS Involvement, Matched Sample of Youth Admitted to FCT and Group Homes, FY09-FY13

	FCT	Group Homes
Total	1246	1441
Mean # of Prior DJS Complaints (SD)	5.3 (3.8)	6.7 (4.9)
Mean Age at First DJS Complaint (SD)	13.8 (2.1)	13.4 (2.0)
Any Prior DJS Committed Residential Placements	36%	44%
Mean # of Prior DJS Committed Residential Placements (SD)	1.7 (1.2)	1.7 (1.2)

Length of Stay

The average length of stay (ALOS) for youth in FCT treatment was 161 days (Figure 5). By comparison, youth who were admitted to group homes spent an average of 213 days in these placements between FY09 and FY13.

Figure 5. Length of Stay in FCT and Group Homes, Average Number of Days, Matched Sample FY09-FY13



Juvenile Justice System Outcomes

Outcomes of interest in the juvenile justice system were any adjudication and commitment to DJS post treatment discharge. In addition to bivariate tests of association between treatment condition (FCT or group care) and each outcome, a multivariate survival analysis technique, Cox regression, was used to explore possible differences between the FCT group and the matched comparison group. The advantages of the Cox regression model (and other time-to-event or event history analyses) include their ability to respond to different times “at risk” – in this case, different dates of discharge from FCT or group care – in analyzing data, as well as their ability to control for relevant variables. Because of the use of matching covariates in the propensity score matching process, demographic and prior offense-related characteristics were not included as control variables during the survival analyses. However, variables of interest during the course of treatment were controlled. Specifically, length of treatment and re-adjudication during treatment (for an offense occurring either prior to or during treatment) were control variables of interest. The results of this analysis include hazard ratios, which are interpreted as a measure of the risk of an outcome. Values greater than 1.00 indicate increased odds of the outcome (i.e., re-adjudication or commitment), and values less than 1.00 indicate decreased odds of the outcome. Figures 6 and 7 display primary findings from these analyses, described in text below.

Figure 6. Percentage of Youth in a Matched Sample Who Were Re-adjudicated and Committed to DJS Post-Discharge

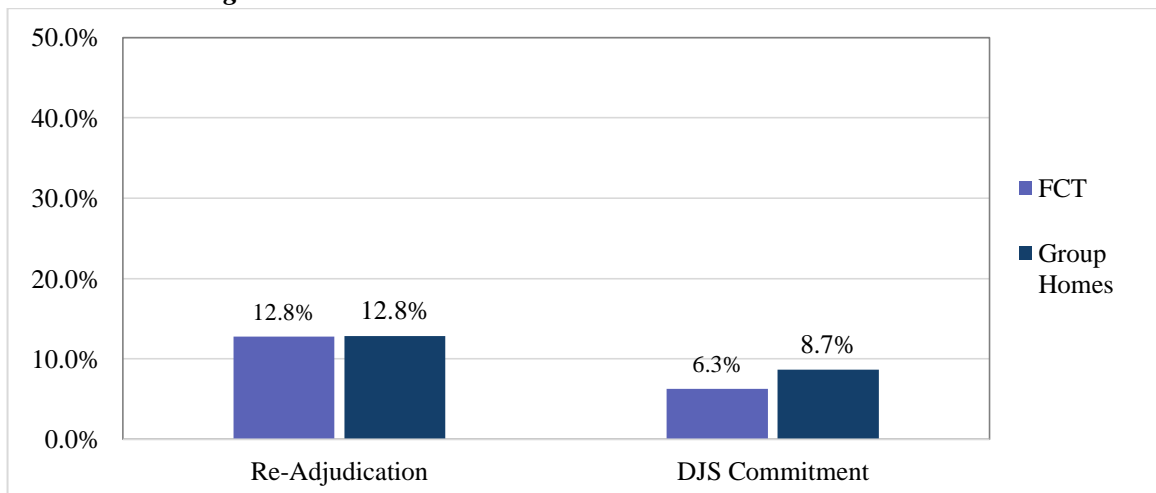


Figure 7. Hazard Ratios from Cox Regression Models of Re-Adjudication and DJS Commitment Post-Discharge

Variable	Re-Adjudication	DJS Commitment
Treatment Condition (FCT)	0.89	0.61***
Adjudication during Treatment	1.86***	2.33***
Length of Treatment (Months)	0.96**	0.94**

** $p < .01$ *** $p < .001$

Model fit for re-adjudication: Likelihood ratio $\chi^2 = 16.42$, $df = 3$, $p < .001$

Model fit for commitment: Likelihood ratio $\chi^2 = 27.03$, $df = 3$, $p < .0001$

Re-Adjudication Outcomes

Among the 2,687 youth who were matched, 344 (approximately 13%) were re-adjudicated after being discharged from treatment but before the study end date of June 30, 2014. In the FCT group, 159 (12.8%) were re-adjudicated, and in the group care sample, 185 (12.8%) were re-adjudicated. This difference was not statistically significant in a bivariate Pearson chi-square or in the multivariate survival analysis, although the hazard ratio in the survival analysis is in the expected direction (less than one, indicating a non-significantly lower risk for the FCT group). In terms of control variables, both length of treatment and re-adjudication during treatment were statistically significant, with longer lengths of treatment associated with a decreased risk of re-adjudication and new adjudication during treatment associated with an increased risk of re-adjudication post-treatment.

Commitment Outcomes

In both groups, 203 youth (approximately 7.5%) were committed following discharge from treatment. Fewer youth receiving FCT ($n=78$, 6.3%) were committed than youth in group care ($n=125$, 8.7%), and this difference was statistically significant in both bivariate and multivariate models. In the Cox regression model of commitment post-discharge, the hazard ratio of 0.61 indicates a 39% decreased risk of re-commitment for FCT youth compared with youth in the group care condition. As in the re-adjudication model, youth who remained in treatment longer showed a decreased hazard of commitment, but youth who were adjudicated for a new offense during treatment showed a greater risk of being committed after discharge.

Criminal Justice System Outcomes

In the matched sample, there was a significant difference in bivariate and multivariate analyses of adult criminal justice system outcomes. FCT participants experienced lower rates of both adult arrest resulting in conviction and criminal justice system incarceration² than their matched group care counterparts. Figure 8 displays frequencies of adult outcomes, and Figure 9 displays results of the multivariate analyses for both outcomes.

² This study used the Maryland Department of Juvenile Services definition of adult incarceration, which includes suspended sentences.

Figure 8. Percentage of Youth Who Were Convicted and Incarcerated in the Adult Criminal Justice System Post-Discharge

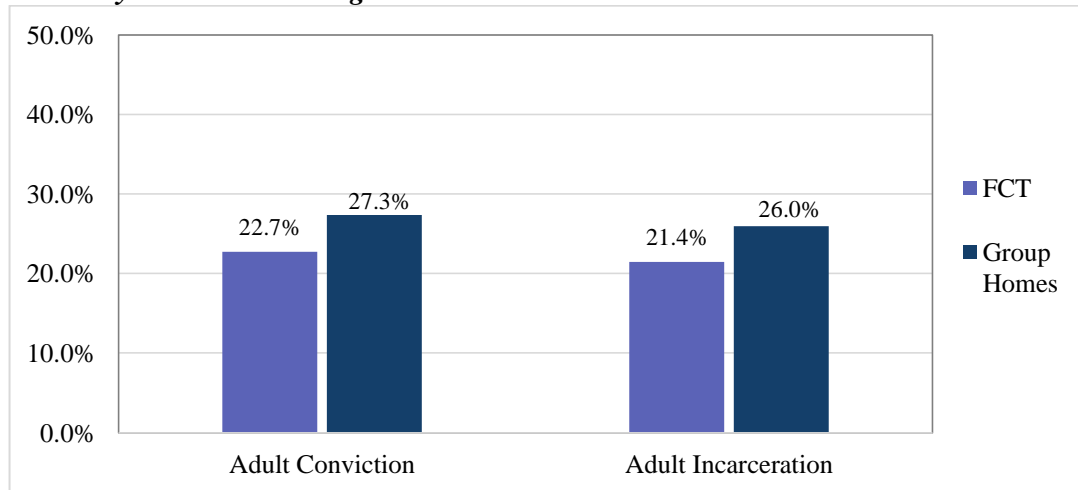


Figure 9. Hazard Ratios from Cox Regression Models of Adult Conviction and Incarceration

Variable	Adult Conviction	Adult Incarceration
Treatment Condition (FCT)	0.75***	0.74***
Length of Treatment (Months)	0.98	0.98

*** $p < .001$

Model fit for conviction: Likelihood ratio $\chi^2 = 14.98$, $df = 2$, $p < .001$

Model fit for incarceration: Likelihood ratio $\chi^2 = 14.48$, $df = 2$, $p < .001$

Following propensity score matching, the number of youth who had been placed in group care and experienced an adult arrest resulting in conviction was 394 (27.3%). For the FCT group, this number was 283 (22.7%). In a bivariate Pearson chi-square, this difference was found to be statistically significant ($\chi^2 = 7.60$, $df = 1$, $p < .01$). Similarly, the time to adult arrest resulting in conviction was significantly different between groups in a multivariate Cox regression analysis, controlling for length of treatment. The hazard ratio in this survival analysis was 0.75 ($p < .001$). This multivariate result indicates that youth in the FCT group had a 25% lower rate of adult arrest resulting in conviction relative to group care youth, controlling for time in treatment. Distinct from the juvenile justice results, length of treatment itself was non-significant in this model.

In this matched sample, 374 (26.0%) of group care youth experienced an adult arrest resulting in a sentence of incarceration during the study period, as compared with 267 (21.4%) of the FCT sample. This difference was significant in a Pearson chi-square analysis ($\chi^2 = 7.53$, $df = 1$, $p < .01$). In the multivariate survival analysis, this result remained statistically significant when controlling for length of treatment (hazard ratio = 0.74, $p < .001$), indicating a 26% decrease in hazard of adult incarceration for FCT participants relative to group care participants. Unlike the juvenile justice findings, length of treatment was not significant in this model.

Combined Analyses

Using logistic regression, we explored juvenile and criminal justice system outcomes together. In this set of models, we combined juvenile re-adjudication and adult conviction to create a single “conviction” variable, and we combined DJS commitment and adult sentence of incarceration to create one “incarceration” variable. In the matched sample, there was a significant difference between groups in bivariate and multivariate analyses of both

outcomes, with FCT participants having significantly lower rates of both arrest and incarceration in the combined juvenile and adult outcomes than their matched group care counterparts (Figure 10).

Figure 10. Odds Ratios from Logistic Regression Models of Combined Juvenile and Adult Outcomes

Variable	Conviction	Incarceration
Treatment Condition (FCT)	0.76**	0.68****
Length of Treatment (Months)	0.94****	0.94****

** $p < .01$ **** $p < .0001$

Model fit for conviction: Likelihood ratio $\chi^2 = 38.98$, $df = 2$, $p < .0001$

Model fit for incarceration: Likelihood ratio $\chi^2 = 45.18$, $df = 2$, $p < .0001$

Following propensity score matching, the number of youth who had been placed in group care and experienced a juvenile or adult conviction was 524 (36.4%). For the FCT group, this number was 406 (32.6%). In a bivariate Pearson chi-square, this difference was found to be statistically significant ($\chi^2 = 4.22$, $df = 1$, $p = .04$). In the logistic regression model, treatment condition was again significant, with the FCT group having approximately 24% lower odds of conviction (odds ratio = 0.76, $p = .001$), controlling for length of treatment, compared to the group care youth. Length of treatment was also significant, with each additional month of service associated with a six percent decrease in odds of conviction (odds ratio = 0.94, $p < .0001$).

In the matched sample, 458 (31.8%) group care youth experienced either commitment in the juvenile justice system or a sentence of incarceration in the criminal justice system. Among FCT youth, 326 (26.2%) experienced either of these outcomes. Again, this difference was statistically significant in a Pearson chi-square analysis ($\chi^2 = 10.21$, $df = 1$, $p < .01$). In the multivariate logistic regression analysis, this result remained statistically significant when controlling for length of treatment (odds ratio = 0.68, $p < .0001$), with a 32% decrease in odds of juvenile or adult incarceration for FCT participants relative to group care participants. Length of treatment was also significant in this model, with each additional month of treatment associated with a six percent decrease in odds of incarceration, controlling for treatment group (odds ratio = 0.94, $p < .0001$).

Subsample Analyses

As populations of specific interest, additional analyses were conducted with female youth only and with older youth (ages 16 and over at initiation of treatment) to determine the effectiveness of FCT relative to group care for these samples. FCT has invested time and training into providing trauma-informed services, which they regard as particularly relevant for female juvenile justice populations due to the large proportion of court-involved girls with a history of victimization (Chesney-Lind & Shelden, 2013). Success with older youth is particularly critical to interrupting chronic trajectories of offending, and since most delinquent youth desist by age 16 at the latest, older youth who engage in delinquency may be at increased risk of becoming chronic offenders into adulthood (Thornberry et al., 2012). Bivariate Pearson chi-square analyses and multivariate Cox regression models were again conducted to investigate differences in outcomes between each FCT subsample and the group home comparison group subsample.

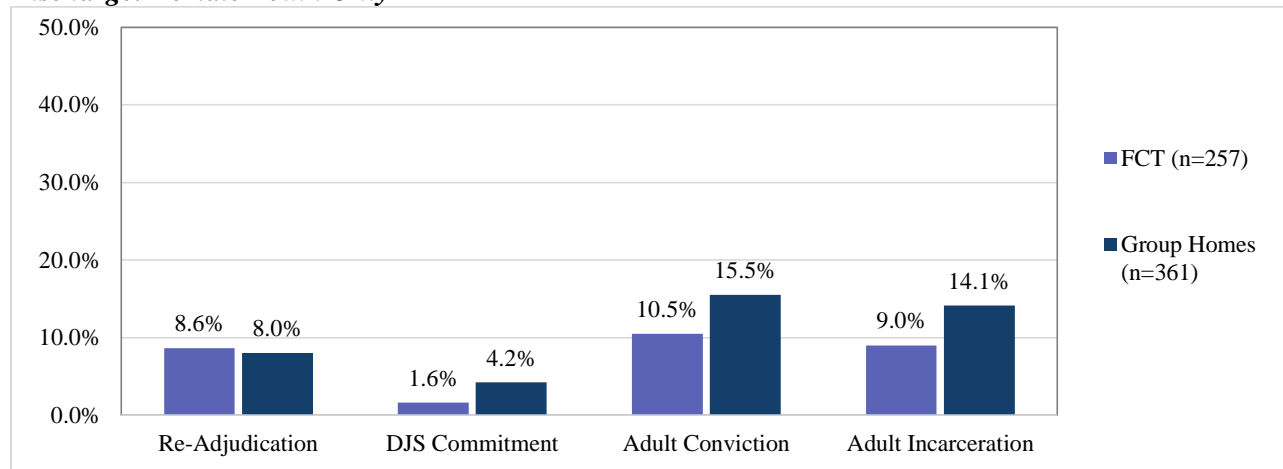
Female Youth

The female subsample was created in a way similar to the overall juvenile justice sample. Female youth who received FCT during the study period were matched to a sample of females with group home or treatment group home stays. In this case, however, one-to-one nearest neighbor propensity score matching (PSM) without replacement was used to create the sample. As before, all matching covariates (see Introduction for a complete

list) were non-significant following the PSM, indicating a balanced sample of statistically equivalent groups, post-match. The sample sizes for the female analyses were 257 FCT youth and 361 group care youth. Outcomes were juvenile re-adjudication, juvenile commitment, adult conviction following arrest, and adult incarceration (including suspended sentences). These analyses and outcomes match the approach taken with the full sample.

Compared to the full sample, few of the female youth had any of the outcomes explored in these analyses (Figure 11). This finding is consistent with ongoing data collection by the Federal Bureau of Investigation (n. d.) indicating female youth and young adults comprise a relatively small proportion of juvenile and young adult crime statistics. The most prevalent outcome was conviction in the adult system post-discharge, with 27 (10.5%) of the FCT subsample and 56 (15.5%) of the group care subsample experiencing this outcome post-treatment. Other outcomes were much less frequent: incarceration in the adult system (n=23, 9.0% of FCT subsample; n=51, 14.1% of group care subsample); re-adjudication in the juvenile system (n=22, 8.6% of FCT subsample; n=29, 8.0% of group care subsample); and commitment in the juvenile system (n=4, 1.6% of FCT subsample; n=15, 4.2% of group care subsample). With the exception of juvenile re-adjudication, a smaller percent of FCT female youth experienced any outcome relative to group care female youth.

Figure 11. Percent of Youth Who Were Involved With the Juvenile and Criminal Justice Systems Post-Discharge: Female Youth Only



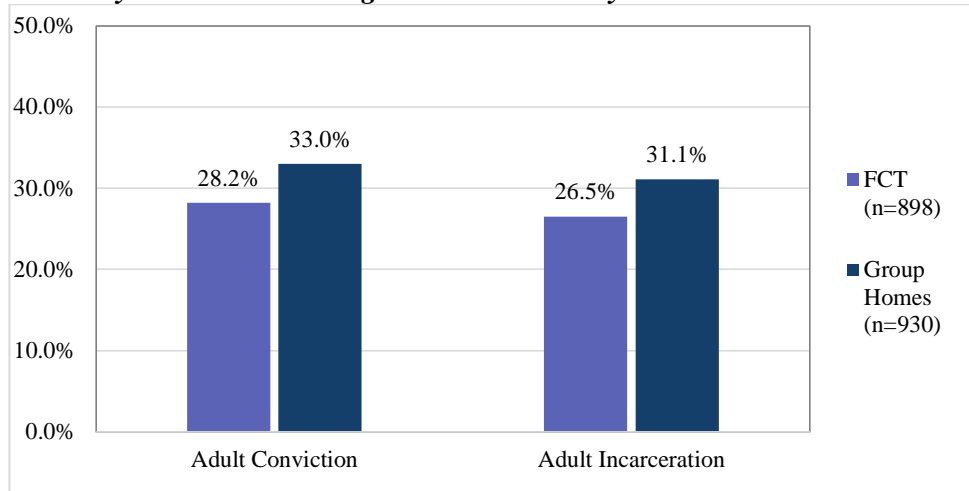
All differences were non-significant at the bivariate level, although the results for new juvenile system commitment ($\chi^2=3.40$, $df=1$, $p=.065$), adult conviction ($\chi^2=3.24$, $df=1$, $p=.072$), and adult incarceration ($\chi^2=3.82$, $df=1$, $p=.051$) post-discharge approached significance. Results from multivariate analyses could not be interpreted, as overall model fit was non-significant in each Cox regression model. The lack of model fit could be due to limited matching covariates of relevance for females, as compared with the model as a whole; this is a question for future research.

Older Youth

The older youth subsample was created by analyzing data for individuals ages 16 and over at treatment admission. Again, PSM was used to match the FCT sample to a statistically equivalent group of older youth in group homes or treatment group homes during the study period. Like the full sample, one-to-one nearest neighbor, with replacement, was the matching strategy selected. All matching covariates (see Introduction for a complete list) were non-significant following the PSM, indicating a balanced sample of statistically equivalent groups, post-match. The match yielded a subsample of 898 FCT youth and 930 group care youth. For this subsample, only the adult outcomes were of particular interest (conviction following an adult arrest and incarceration following an adult arrest), due to the relatively short time at risk for this subsample in the juvenile justice system.

Significant differences in rates of both outcomes were determined in bivariate and multivariate findings. In the Pearson chi-square analysis of conviction following an arrest in the adult system, 253 youth (28.2%) in the FCT condition were found to have the outcome, relative to 307 (33.0%) in the group care condition ($\chi^2=5.03$, $df=1$, $p<.05$; Figure 12). The multivariate survival analysis, controlling for length of stay in treatment, identified a significant hazard ratio of 0.77 ($p <.01$) for treatment condition, indicating a 23% decrease in risk of adult conviction for FCT youth relative to group care youth in the older subsample. Length of treatment was non-significant in this analysis.

Figure 12. Percent of Youth Who Were Involved With the Juvenile and Criminal Justice Systems Post-Discharge: Older Youth Only



For incarceration, including suspended sentences, following an adult arrest, the numbers experiencing the outcome were 238 (26.5%) in the FCT group and 289 (31.1%) in the group care condition ($\chi^2=4.65$, $df=1$, $p<.05$). The hazard ratio for treatment condition in this analysis was 0.77 ($p <.01$), indicating that older youth in the FCT condition again had a 23% decreased risk of adult incarceration compared with group care youth. Length of treatment approached statistical significance but was non-significant in this multivariate model (hazard ratio = 0.98, $p=.068$).

Cost Analyses

Data

Data for the cost analyses were derived from the same data sources used for the comparative outcome analysis. Dates of service for the admission and discharge from FCT were provided by IFCS, and the dates of services for out-of-home placements came from DJS administrative data. The costs included in the analysis were comprised of costs for out-of-home placements plus the cost of the FCT intervention. Out-of-home placements included any stay where the youth spent the night away from their home and for which there was a payment made to a provider. This included placement costs for group homes, secure facilities, foster care, emergency shelters, residential treatment facilities, and psychiatric hospitals. FCT was the only therapy included that was not part of a rate for a residential program. As a result, the cost analysis analyzed whether the costs of FCT were offset by a reduction in placement costs. The analysis did not include the cost to the families for time, travel, or any payment they may have made related to FCT or placements, nor did it include the cost to DJS for caseworkers and non-personnel expenses outside of payments to placement service providers.

The data were reviewed to eliminate duplicate and overlapping entries for the same type of placement. Stays in detention were allowed to overlap with stays in other residential placements since providers of these placements were often paid to maintain the placement for the youth during the stay in detention. After establishing

admission and discharge dates for each placement, lengths of stay were computed for each placement and then multiplied times the per diem rate for each type of placement. Standard per diems were used for each type of placement based upon the average rates paid for placements in Maryland State Fiscal Year 2013. The rates were primarily derived from the Maryland Department of Juvenile Services' Data Resource Guide (DRG; 2013). The cost for FCT was taken from the contract between IFCS and the State of Maryland.

Analyses

Two types of cost analysis were employed. First, the costs for the initial intervention of FCT and the group home placement were compared. Second, all out-of-home placement costs plus the cost of the FCT intervention were compared in one-year increments for two years after admission. Costs for each placement and the FCT intervention were calculated by multiplying the length of stay in each placement or intervention times the standard rate paid for each intervention. The costs for any placements that overlapped the beginning or end of a 12-month time period were prorated based on the number of days of placement within the time period.

Results

Cost Comparison of FCT Versus Group Homes

The initial intervention cost for FCT as compared with group home placement for the comparison group was less costly by \$30,170 per youth, on average. This was attributable to a combination of youth having longer lengths of stay in group homes (201 days vs. 151 days for FCT) and the lower daily cost of FCT (\$80 vs. \$210 for the group home; see Figure 13).

Figure 13. Cost Variables and Average Cost of FCT Versus Group Home Placements

	FCT (n=1246)		Group Homes (n=1441)		Comparison		
	Average	(SD)	Average	(SD)	Difference	95% Confidence Interval ¹	p-value ¹
Length of Treatment (days)	151	74	201	147			
Cost/Day of Treatment (\$) ²	80	-	210	-			
Cost of Treatment (\$)	12,074	5,927	42,244	30,923	-30,170	-31,801 -28,538	<.001

¹p-values and 95% confidence intervals are calculated using bootstrapping with replacement simulated 5000 times.

²Cost/Day of Treatment for FCT was set by contract with the State of Maryland. For group home youth, the Cost/Day was based on the published average cost of group homes in DJS's DRG for FY 2013.

Post-Admission Placements Cost Comparison

The costs for FCT plus out-of-home placements were \$41,729 less per youth, on average, for the FCT group as compared with the control group for the 12 months after the start of each intervention. The \$12,008 spent on FCT was offset by \$44,158 saved on group homes and other residential child care, and \$8,848 for secure facilities (Figure 14).

Figure 14. 12-Month Post-Admission Total Placement and FCT Costs For FCT Versus Group Home Youth (\$)

	FCT (n=1246)		Group Homes (n=1441)		Comparison			
	Average	(SD)	Average	(SD)	Difference	95% Confidence Interval ¹		p-value ¹
Total	32,791	36,683	74,521	38,523	-41,729	-44,534	-38,925	<.001
FCT	12,008	5,644	0	0	12,008	11,696	12,319	<.001
Secure Facility ²	16,699	33,509	25,547	41,932	-8,848	-11,670	-6,025	<.001
Residential Child Care ²	3,610	13,459	47,768	26,586	-44,158	-45,738	-42,578	<.001
Family Based Out-of-Home Care ²	236	2,741	881	4,794	-645	-932	-358	<.001
Psychiatric Hospital	238	2,394	325	3,518	-87	-310	137	0.45

¹p-values and 95% confidence intervals are calculated using bootstrapping with replacement simulated 5000 times.

²Secure Facilities include detention plus hardware and staff secure placements. Residential Child Care includes group homes, residential treatment facilities, and shelter care. Family Based Out-of-Home Care includes placements in foster homes, therapeutic foster care, family shelter care, and independent living.

Placements and FCT costs 12- to 24-months post-admission were an average of \$20,339 less per youth for the FCT group than the control group (Figure 15).

Figure 15. 12- To 24-Month Post-Admission Placement and FCT Costs For FCT Versus Group Home Youth (\$)

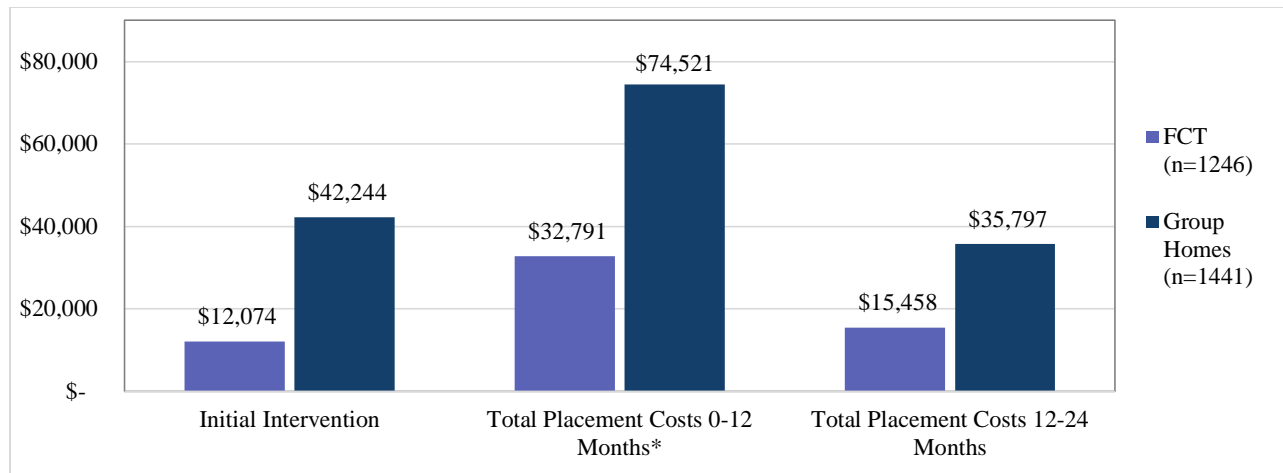
	FCT (n=1124)		Group Homes (n=973)		95% Confidence			
	Average	(SD)	Average	(SD)	Difference	Interval*		p-value*
Total	15,458	35,885	35,797	46,728	-20,339	-23,894	-16,785	<.001
FCT	80	1,109	0	0	80	11	149	0.02
Secure Facility	11,543	31,805	21,968	39,712	-10,425	-13,458	-7,391	<.001
Residential Child Care	3,532	16,987	11,699	27,501	-8,167	-10,088	-6,247	<.001
Family Based Out-of-home Care	269	2,708	1,785	7,324	-1,516	-1,980	-1,052	<.001
Psychiatric Hospital	33	1,041	345	6,704	-311	-705	82	0.12

*p-values and 95% confidence intervals are calculated using bootstrapping with replacement simulated 5000 times.

¹Secure Facilities include detention plus hardware and staff secure placements. Residential Child Care includes group homes, residential treatment facilities, and shelter care. Family Based Out-of-Home Care includes placements in foster homes, therapeutic foster care, family shelter care, and independent living.

**Youth who would have aged out of the juvenile justice system would not have placement costs. Since the youth in the two groups were matched by age, this would not bias the difference between the two groups.

Figure 16. Average Placement Costs For FCT Versus Group Home Youth* (\$)



*Includes the initial intervention costs.

Taken as a whole, the investment in FCT appears to result in lower subsequent placement costs (see Figure 16). This difference is sustained in the second year after admission to FCT. There is still an issue of selection bias, for while IFCS has a no-reject policy for referrals, case workers could be referring youth to FCT based on family engagement or other omitted variables whose effect may not be incorporated in pre-admission costs. Nevertheless, while this potential bias should be noted, the large difference in costs is unlikely to be due to omitted variables alone.

Implementation Factors

Fidelity to the Practice Model and Engagement in Treatment

If youth and families are to be helped, FCT must be delivered in the way it was designed and with a high degree of clinical skill. Fidelity to the FCT model is assessed using 15 Adherence Measures that are tailored to each of the four phases of treatment; these measures are also used to assess case progress. FCT’s licensing standards require collection and entry of fidelity data through the final phase of treatment completed, for families that are currently served and those who have been discharged from services. For purposes of the analyses described below, we calculated fidelity as a proportion between 0.00 and 1.00 of all possible measures completed for each client, at the particular phase of treatment a client had reached. If a client had not completed all four phases of treatment, fidelity was calculated out of the number of measures expected to be completed by the end of the prior phase of treatment.

A critical component of FCT’s model of service provision is engagement of the youth and family. Extensive training and supervision of FCT clinicians focus on joining and engagement skills for work with families. During the first phase of treatment, the family defines their “family constellation,” and additional members are invited by the nuclear family to participate in structural phase of treatment. Successful engagement of the client and family, according to FCT’s model, has not been achieved unless the clinician has made at least 11 direct contacts with the client and family. For these analyses, “engagement” was constructed as a dichotomous variable reflecting number of direct contacts (0=less than 11, 1=11 or more).

Data and Sample

Additional client-level and programmatic variables were of particular interest to this study. These variables were either applicable only to youth in the FCT condition (e.g., measures of fidelity to the FCT model and engagement with clients according to the FCT definition) or were not available for all youth served in group

homes (e.g., Axis I DSM diagnoses). Therefore, a one-group analysis was conducted to explore possible associations between these variables and youth outcomes. Due to the one-group design of this component of the study, no comparison group could be constructed. Data were matched across sources (IFCS, DJS, and DPSCS), but no propensity scores were used in the absence of a comparison group.

In keeping with FCT's timeline on the adoption of an electronic database to track information on service provision, the dates for the one-group analysis (and therefore sample size) differ from earlier analyses. The sample size for some program variables matched to outcomes was as high as 799, although a total of 593 youth could be matched using information available in both the FCT fidelity dataset and the DJS and DPSCS data. The fidelity match rate improved from 58.1% in FY11 to greater than 80% in FY12 and FY13, likely reflecting improvements in the quality of FCT electronic record keeping over time. Valid sample size for multivariate analyses was 499 due to missing data on some covariates. As in earlier analyses, outcomes were measured if they occurred on or before June 30, 2014. Because a substantial proportion (approximately 25%) of FCT youth with recorded fidelity data in fiscal years 2011-2013 were unmatched to state agency data, and because further data were missing for some youth, interpretations of one-group analyses should be considered exploratory.

Analyses

Descriptive and multivariate analyses were conducted with this group of youth. Analyses included the following client and family-level variables: sex, age at admission to FCT, race (coded as White or non-White), location (rural, suburban, or urban), Axis I mental health diagnosis, family income, age at first delinquent offense, prior commitment to a residential facility, and prior adjudication for a violent offense. Analyses included the following service-provision variables: whether the therapist engaged the family (11 or more direct contacts), length of treatment in total days between admission and discharge, and proportion total fidelity (number of items completed to indicate model adherence, as described above, divided by total possible number of items). We also evaluated whether a client was discharged for a reason outside the therapist's control (family or individual relocated, funding was not available to continue, or youth transferred to another agency); however, this was the case for only 17 youth in this three year period. This small number relative to the sample size for analysis did not allow for inclusion of the variable in the analyses. Logistic regression analyses were conducted to investigate multivariate relationships between each of these variables and juvenile and adult justice system outcomes.

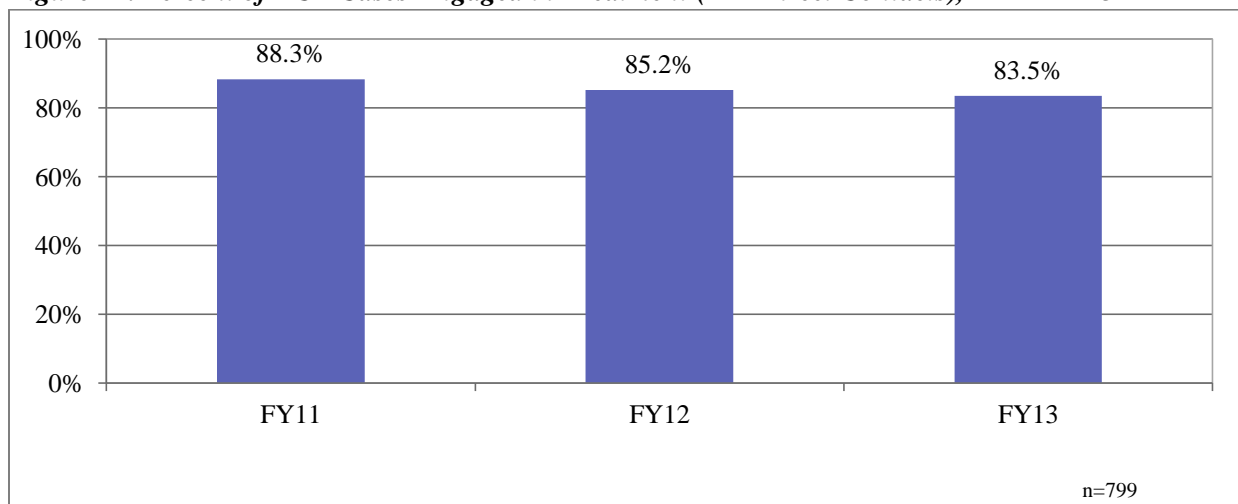
Results

Descriptive Findings

Fidelity to the practice model was quite high across the three years of data captured. In FY11, the average fidelity rating as a proportion was 0.78 (SD=0.30). In FY12, the average was 0.81 (SD=0.28), and in FY13, the average was 0.72 (SD=0.29). The average across years was 0.77 (SD=0.29). In other words, in the three years of data, FCT providers achieved approximately 77% adherence, as measured by number of designated activities completed.

Engagement was measured for all 799 youth who could be matched to DJS and DPSCS data. Engagement, defined as 11 or more direct contacts between the FCT clinician and the youth and/or family, was noted in 677 (85.7%) cases across the three years of data, with ranges from 83.5% (FY13) to 88.3% (FY11), as displayed in Figure 17.

Figure 17. Percent of FCT Cases Engaged in Treatment (11+ Direct Contacts), FY11-FY13



Treatment dosage was an additional consideration of interest for this study. Unfortunately, valid data for number of sessions could not be matched for most youth and families. Instead, we used length of service, in days, as a proxy measure for dosage, with the assumption that longer treatment spells will usually mean larger doses of the intervention. The average length of treatment was 147.1 days ($SD=75.8$), with a range of 7 (minimum) to 642 (maximum) days and with valid data on 790 youth. On average, youth spent approximately 5 months receiving services.

Multivariate Findings

Four multivariate logistic regression models were conducted to determine associations between program and implementation variables and outcomes. Each outcome was modeled separately: juvenile re-adjudication, juvenile commitment, adult arrest resulting in conviction, and adult sentence of incarceration. Contrary to our expectations, measures of fidelity and engagement were non-significant in all models. These findings may reflect the high levels of fidelity and engagement in the sample; in other words, greater variability in these implementation factors might have different results. Also, relatively few individuals experienced each outcome (ranging from $n=32$ with juvenile commitment to $n=68$ with adult conviction), so the non-significant findings could also result from low statistical power to detect relatively rare events in the sample.

On the other hand, dosage, measured as length of service in days, was a significant predictor of re-adjudication (odds ratio = 0.99, $p < .01$), adult conviction (odds ratio = 0.99, $p < .05$), and adult incarceration (odds ratio = 0.99, $p < .05$). As anticipated, longer treatment spells were associated in each of these models with decreased odds of the problematic outcome, such that each additional day of treatment predicted a 1% decrease of the outcome in question.

Significant associations were identified for gender in both juvenile justice models (boys carrying a higher risk of further juvenile justice involvement) and suburban jurisdiction in the model of adult conviction (with suburban youth having lower odds relative to urban youth). In terms of youth delinquency history, age at first delinquent complaint was significantly associated with adult incarceration (odds ratio = 0.86, $p < .05$), with younger delinquency initiation predicting increased odds of the outcome. Age at FCT service initiation operated differently from other variables, with younger ages at initiation significantly predicting increased odds of juvenile outcomes and older age significantly predicting increased odds of adult outcomes. These seemingly contradictory findings likely reflect the amount of time at risk in each system, with younger individuals having greater time at risk in the juvenile justice system and older individuals having greater time at risk in the criminal

justice system. All other variables were non-significant. See Figure 18 for more detail on multivariate findings on implementation and youth-level factors.

Figure 18. Odds Ratios for Logistic Regression Models of Implementation and Youth Predictors of Juvenile and Adult Outcomes, FCT-Only Group FY11-FY13

Variable	Re-Adjudication	DJS Commitment	Adult Conviction	Adult Incarceration
Fidelity (proportion)	0.58	0.30	1.25	1.05
Engagement	2.31	2.64	1.67	1.69
Length of treatment (days)	0.99**	1.00	0.99*	0.99*
Youth has mental health diagnosis	0.76	0.95	1.05	1.06
Prior adjudication for violence	0.41	0.49	1.37	1.22
Prior committed placement	1.62	2.04	1.09	1.16
Age at first del. complaint	1.12	1.15	0.89	0.86*
Age at FCT service initiation	0.53***	0.58**	2.09***	1.99***
Gender (male)	2.36*	5.32*	1.87	1.66
Race/ethnicity (nonwhite)	1.34	1.35	1.70	1.59
Family income	1.00	0.97	0.99	1.01
Suburban vs. urban jurisdiction	1.24	1.00	0.44*	0.65
Rural vs. urban jurisdiction	1.45	0.93	0.87	1.14

* $p < .05$ ** $p < .01$ *** $p < .001$; $n=499$

Model fit for re-adjudication: Likelihood ratio $\chi^2 = 46.52$, $df = 13$, $p < .001$

Model fit for commitment: Likelihood ratio $\chi^2 = 27.31$, $df = 13$, $p = .01$

Model fit for conviction: Likelihood ratio $\chi^2 = 63.36$, $df = 13$, $p < .001$

Model fit for incarceration: Likelihood ratio $\chi^2 = 54.93$, $df = 13$, $p < .001$

Summary and Next Steps

Findings from this study replicate and extend an earlier evaluation of FCT (Sullivan et al., 2012). With a longer study period and larger sample, results continue to show an effect of FCT on juvenile justice commitment following discharge from treatment. In a multivariate survival analysis, the adjudication rates for FCT youth and group care youth are not significantly different. However, FCT youth show non-significantly lower rates of adjudication. Moreover, given the findings in the cost analysis, FCT appears to be substantially more economical than group home use.

Of particular interest is the potential FCT may have to decrease adult criminal justice system involvement. In these analyses, youth in the FCT group show more favorable outcomes than group care recipients following the propensity score match that creates statistical equivalence between the two groups. FCT is associated with a decreased risk of adult arrest leading to conviction, as well as a sentence of incarceration in the criminal justice system (this outcome includes suspended sentences). A subsample of FCT participants ages 16 and older also show significantly lower rates of these two adult criminal justice outcomes relative to group care recipients, suggesting that FCT may be effective at disrupting chronic offending trajectories.

At a descriptive level, program variable findings indicate high levels of treatment engagement and fidelity to the practice model. In multivariate models, these variables are unrelated to juvenile and adult outcomes. Limitations due to sample size and missing data, and potentially low statistical power, might explain the null findings. On the other hand, it could be that FCT clinicians are consistent high-performers with respect to program elements, and that implementation factors simply do not vary enough to determine associations with relatively rare outcomes. Ongoing efforts to improve data collection (for example, by connecting fidelity data to other FCT data in a single database) may result in more informative findings in future analyses.

Greater dosage, as measured by length of treatment, is associated with decreased risk of problematic outcomes in several one- and two-group analyses. Generally speaking, longer treatment spells seem to result in some positive outcomes. It remains to be seen whether additional dosage indicators reflecting intensity of treatment (such as number of sessions or duration of sessions per month, for example) could also predict positive outcomes.

Additional research is needed to replicate this report's findings elsewhere and with other populations of interest. The analysis of the female sample in this study was inconclusive, likely because of the small number of females with the outcomes measured. Additional research should use larger female samples and explore additional potential matching covariates and service characteristics that may be relevant for this subsample. Because FCT has worked to develop their trauma-informed approach to juvenile court-involved females, a specific study dedicated to better understanding how well FCT works with female youth seems warranted. Because only juvenile court-involved youth were eligible for this study, no research yet shows the effect of FCT on youth with child welfare and mental health services involvement. The so-called "crossover" population, moving from one system (often child welfare) to another (often juvenile justice) has a documented high degree of need (Herz & Ryan, 2008) that may be best met through trauma-informed, family-focused treatment such as FCT. This proposition remains untested at present, as is the quality of trauma treatment actually provided through FCT.

Disproportionate minority contact in the juvenile and adult justice systems is well-documented but not a focus of study here. Given that the majority of youth in the matched sample were identified as African American or Black, it would be worthwhile to determine whether FCT has any effect at reducing disproportionality in later commitments and adult system encounters for youth with juvenile justice histories. It is also possible that FCT could interrupt the disproportionate contact of minority youth with child welfare histories, as documented in Ryan and colleagues (2007).

Finally, although propensity score matching (PSM) has a number of advantages over analysis using non-equivalent comparison groups, it is only effective insofar as all meaningful covariates differentiating groups are included (Guo, Barth, & Gibbons, 2006). Future research on FCT could include randomization to treatment conditions, providing a stronger study design to allow for greater certainty in the validity of results.

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