



Scaling-Up Evidence-Based Programs Using a Public Funding Stream: a Randomized Trial of Functional Family Therapy for Court-Involved Youth

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Abstract

The Affordable Care Act expanded access to Medicaid programs and required them to provide essential health benefits, which can include prevention services. This study assesses the costs and benefits to using Medicaid funding to implement a well-known evidence-based program, Functional Family Therapy (FFT), with a sample of juvenile justice-involved youth. The study also provides a rigorous test of FFT accommodated for a contemporary urban population that is gang at risk or gang-involved. One hundred twenty-nine predominantly minority and low income families were randomly assigned to receive an enhanced version of FFT or an alternative family therapy. Data from pre- and post-intervention interviews with youth and parents, court records of contacts with the justice system and residential placements, official records of community services, and the costs of placements and services are summarized. The intervention was implemented with fidelity to the FFT model using Medicaid funding. Treatment and control subjects received a wide range of community and residential services in addition to FFT. A higher percentage of treatment subjects than controls received services following random assignment, but the cost per youth served was lower for treatment than control youth, primarily because control youth were more often placed in residential facilities. Recidivism during the 18-month follow-up period was lower for FFT than for control youth. The combination of cost savings realized from avoiding more costly services and the expected future savings due to recidivism reduction suggest the expanded use of evidence-based practices using public funding streams such as Medicaid is warranted.

Keywords Medicaid funding for prevention · Family therapy for court-involved youth · Randomized controlled trial · Functional Family Therapy

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Mental, emotional, and behavioral (MEB) disorders are common among young people in the United States and represent a pressing public health issue.¹ Research suggests that half of all lifetime cases of MEB disorders begin in childhood or adolescence and three quarters occur by the age of 24 (Kessler et al. 2001, 2005). Among a national sample of youth ages 13–18, nearly half (46.3%) reported lifetime prevalence of a mental disorder of some kind (Merikangas et al. 2010). MEB disorders are associated with a host of negative outcomes including other adverse health conditions, poorer school outcomes and employment opportunities, delinquency, violence, and earlier mortality (Institute of Medicine (IOM) and National Research Council (NRC) 2014; McLeod et al. 2012; Kessler 2004; Costello et al. 2003).

The unmet needs of youth with MEB disorders have placed overwhelming demands on education, child welfare and juvenile justice systems (National Research Council and Institute of Medicine 2009; Institute of Medicine 2006). A recent estimate places the total annual economic costs of MEB disorder services for youth at nearly \$250 billion (Eisenberg and Neighbors 2007). As a result, there has been increased interest in preventive and intervention approaches that both reduce the number of youth who develop these conditions and help to ameliorate the negative effects for those living with an MEB disorder.

MEB disorders are preventable and treatable. Risk and protective factors have been well established and first symptoms typically precede a disorder by 2 to 4 years (National Academy of Sciences 2009, Biglan et al. 2004). Interventions that improve parenting and family functioning across the developmental continuum (from prenatal programs through young adulthood) have been shown to reduce antisocial behavior, violence or aggression, substance use disorders and other problem behaviors (Fagan 2013). Research has also shown that when such evidence-based (EB) interventions are delivered with fidelity, they lead to substantial cost savings (Lee et al. 2012; Barnoski 2004).

However, historically, our nation's approach to MEB disorders has been largely reactive rather than preventive, resulting in unnecessary social harm and economic costs. There are a number of structural barriers to prevention service engagement and utilization. Research on barriers to adopting, implementing, and sustaining the use of EB practices has identified numerous features of program models and characteristics of implementing organizations that are related to utilization. These include the provision of ongoing technical assistance, development of performance measures and

benchmarks, monitoring of implementation, staff stability, identification of goals and outcomes, and stakeholder buy-in (Forman et al. 2009; Mihalic and Irwin 2003; Mihalic et al. 2004; Spoth and Greenberg 2011; Spoth et al. 2007).

Arguably the largest obstacle to broader use of EB practices is lack of adequate funding. As documented in Spoth et al. (2013), only 2 to 3% of government healthcare spending is directed towards the implementation of effective prevention practices. Developing funding models and financing systems to support effective programming, especially in inner-city communities such as those included in the current study, is a core challenge to translating research into practice. Spoth et al. (2013) recommend focusing on developing systems for financing “scalable EBIs with existing, proven delivery systems, combining general population or universal EBIs with those that are more targeted, particularly those that address prevalent and costly behavioral health problems” (p. 343).

The 2010 Patient Protection and Affordable Care Act (ACA) was enacted to “improve the accessibility, affordability, and quality of health care” (Obama 2016). The ACA expands MEB disorder coverage to include mental health, substance use disorder services, and other rehabilitative services that support individuals with behavioral health challenges. This expansion of services provides an opportunity for states to reduce MEB disorders by using this public funding stream to broaden the reach of EB practices.

Funding EBs in Pennsylvania

The state of Pennsylvania, through the Pennsylvania Commission on Crime and Delinquency (PCCD), began its efforts to bring effective preventive services to the state nearly two decades prior to the ACA. Working with the Penn State Prevention Research Center, and later the Evidence-based Prevention and Intervention Support Center, Pennsylvania created the infrastructure necessary to support the adoption, implementation, and continuing quality improvement of EB prevention and intervention programs (Bumbarger and Campbell 2012). The PCCD supported preventive service expansion through provision of grants for the adoption and implementation of prevention and intervention programs outlined in the Blueprints for Violence Prevention EB program registry (now Blueprints for Healthy Youth Development, <http://www.blueprintsprograms.com/>).

The funding for Pennsylvania's prevention services comes from two primary sources: Medicaid and county-level grants. All but one of the EB programs operating in Pennsylvania are now approved for Medicaid funding via Behavioral Health and Rehabilitative Services under the category of “outpatient wraparound mental health services not currently on the Medicaid fee schedule” (Campbell and Bumbarger 2012). Pennsylvania provides a model for states and localities

¹ MEB disorders encompass the following: conduct disorder and oppositional defiant disorder, often combined as disruptive behavior disorders; attention deficit hyperactivity disorder (ADHD); anxiety disorders, including posttraumatic stress disorder; depression, drug abuse and dependence, autism spectrum disorders and pervasive developmental disorders, schizophrenia, bipolar disorder, eating disorders, and obsessive compulsive disorder.

interested in adopting or expanding EB prevention services using existing public funding streams.

The Current Study

This study tests the effects of an EB program included in Pennsylvania's prevention infrastructure, Functional Family Therapy (FFT), among a sample of juvenile justice-involved youth in Philadelphia's Family Court. FFT has many of the program features related to high quality program implementation. It is a scalable EB program with an existing, proven delivery system, and it is a targeted program that addresses prevalent and costly behavioral health problems. As such, it is an ideal candidate program for assessing the costs and benefits to using a public funding source to expand the reach of EB programming. The Pennsylvania experience should be instructive to other states considering establishing a similar infrastructure for prevention funding.

Beyond an assessment of the costs and benefits of this novel funding approach, the study also provides a rigorous test of FFT effects under contemporary natural conditions, with an urban, predominantly minority population selected for its high risk for gang involvement. Although research generally supports the effectiveness of FFT for reducing problem behaviors, some evidence (summarized below) suggests that the effects are heterogeneous across time and sub-populations, with minority youth benefiting the least and the magnitude of effects shrinking over time. Hence, a study assessing effects on a predominantly minority population—especially one that is at elevated risk for gang involvement—is warranted.

Functional Family Therapy (FFT) Intervention

FFT is a brief and widely disseminated EB treatment for youth presenting with problem behaviors including delinquency and drug and alcohol abuse (Barton and Alexander 1981; Alexander and Parsons 1982; Waldron and Brody 2010; Waldron and Slesnick 1998; Waldron et al. 2001). The program typically involves 12–15 face-to-face sessions of approximately 1 h during which trained therapists work with the targeted youth as well as his or her caregivers, usually in a home setting. The entire program is usually delivered over a three-month period. FFT is one of the earliest programs to have been identified as a “model” program in the University of Colorado's Blueprints for Violence Prevention collection.

For this study, FFT was accommodated for use with a population at risk for gang membership. Although FFT therapists usually encounter youth who are gang-involved or deemed to be at risk for gang involvement, FFT has no specific module or approach focusing on the influence of gangs and no study to date has specifically investigated its effectiveness for this

population. To address this issue, the Principal Investigators and three members of the project's Advisory Board held a series of meetings with the developers of the FFT program to discuss how the basic FFT approach could accommodate the needs of gang-involved youth. To aid in this process, the Advisory Board developed a list of issues that should be considered in the accommodation. They included such issues as risk factors and reasons for joining gangs, gang types, gang processes, understanding (and debunking) myths about gangs, the role of violence and guns in gang activities, and patterns of retaliatory violence. Based on these discussions, the developer and his team modified the FFT manual and training materials to address issues that are likely to be more salient in a gang population than in a general delinquent population. It is important to note that no core aspect of FFT was removed for this accommodation. The FFT-G manual enhanced the core FFT model by emphasizing careful preparation and knowledge development prior to family engagement with respect to gangs in general, as well as the gang environment in the particular community where the youth and family live. Given the general severity of risk factors in a gang population, FFT-G was designed to involve more direct treatment to address ongoing pressure from neighborhood gang members as well as greater preparation prior to treatment. The FFT-G accommodation also anticipated that additional effort might be required to successfully engage families of gang-involved youth.

Figure 1 shows the logic model relating participation in FFT-G with the study outcomes. It shows the mediators through which FFT-G is expected to reduce youth delinquency and substance use. This model guided the development of measures.

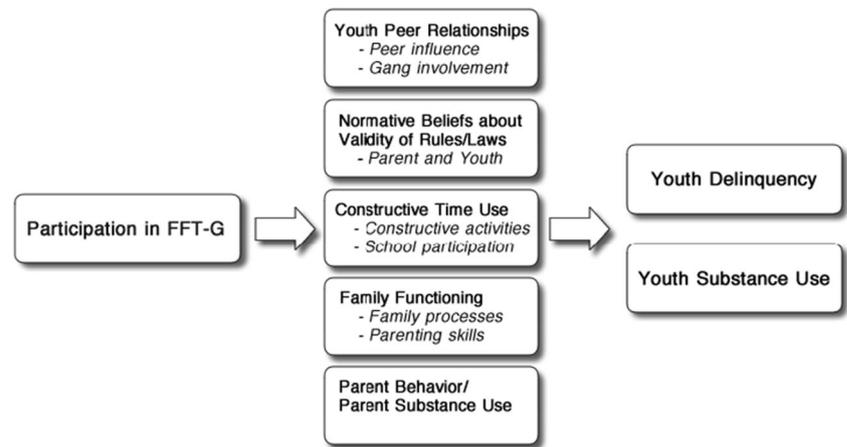
FFT in Philadelphia

FFT was delivered in Philadelphia by three well-established youth service agencies who were supported by a national FFT LLC dissemination team. All three agencies had cadres of therapists trained to deliver FFT and well-established relations both with the Philadelphia Family Court and FFT LLC. FFT LLC provides training and consultation as well as a computerized system for measuring FFT quality assurance. Funding for FFT was initially provided through state grants, but in 2006, when FFT services became eligible for Medicaid funding in Pennsylvania, the Philadelphia agencies began to be reimbursed for FFT services by Community Behavioral Health (CBH), a corporation contracted by the City of Philadelphia to provide MEB services for Philadelphia County Medicaid recipients.

FFT Effectiveness

FFT has undergone numerous evaluations. The earliest study was an RCT involving random assignment of 86 court-

Fig. 1 FFT-G program model



involved youth to one of three control conditions. Recidivism records collected 18 months post-treatment indicated moderate to large effects favoring FFT (effect sizes [ES] ranging from .47 to .72; Alexander and Parsons 1973). Subsequently, 15 English language studies have been published, eight of which included random assignment to conditions. Results from all but one of these studies (Darnell and Schuler 2015) were recently summarized in Hartnett et al. (2016a). They conducted six meta-analyses, one each for studies using randomly and non-randomly assigned groups, and within each of those groups, studies using untreated, treatment as usual, and well-defined alternative treatment control groups. All six analyses yielded an average ES favoring the FFT group. Average ES's ranged from .08 to .90 and were statistically significant in three of the six comparisons. The authors concluded (p. 1) that their results “provide support for the effectiveness of FFT compared with untreated controls and well defined alternative treatments such as cognitive behavior therapy, other models of family therapy and individual and group therapy for adolescents.”

Although results from the entire body of FFT evaluations favor FFT, there is considerable heterogeneity in the size of the effect across studies. While earlier trials reported moderate to large ESs, more recent studies have generally reported small ESs, with the most recent effectiveness trial reporting an ES favoring the control group on a measure of delinquency (Humayun et al. 2017). This pattern, common in social science and biomedical research, has been described as a “replication crisis.”² This trend warrants continued assessment of FFT outcomes in contemporary settings.

Some evidence also suggests that FFT effects may be heterogeneous across sub-populations. Although studies have been conducted in several countries, studies in US populations have seldom involved predominantly minority populations (Darnell and Schuler 2015). The handful of studies that have

involved a majority of youth of color have produced conflicting evidence: Waldron et al. (2001) found no significant effects of FFT on drug use, internalizing or externalizing behavior in a 62% non-White sample. Slesnick and Prestopnik (2009) found that FFT significantly reduced substance use in a 71% non-White sample. Darnell and Schuler (2015) found initial reductions in out-of-home placements for FFT youth in a primarily Latino and African-American population, but these effects faded after 2 months. These results suggest a need to study the durability of FFT effects, especially in minority populations.

Finally, FFT is delivered in this study using a different funding mechanism than has been used in prior studies. As will be described below, making use of this funding stream required certain adaptations to the FFT model. Although Medicaid funding for FFT offers a mechanism through which services can potentially be extended and sustained, it is important to understand the extent to which the required adaptations altered the effective delivery of the program.

Method

The study randomly assigned adjudicated youth from a single courtroom over an approximate two and a half year period to FFT-G and a “treatment as usual” (TAU) condition. The TAU condition involved probation as usual as well as referral to an alternative family therapy program, Family Therapy Treatment Program (FTTP, https://issuu.com/phmc/docs/ftp/brochure_0609_4c-vm-issuu), that was approximately the same intensity and duration as FFT, but was not manualized and had not undergone rigorous evaluation. Similar to FFT, this alternative program seeks to promote healthy family functioning, improve communication, resolve conflicts, and strengthen relationships. FTTP services are also eligible for reimbursement through Medicaid. This study represents an independent evaluation of FFT-G. FFT LLC had no involvement in data collection or analysis.

² A recent volume of “*Perspectives on Psychological Science*” has recently been dedicated to concerns about this issue (Pashler and Wagenmakers 2012).

Study Setting

The study site, Philadelphia, was selected because it had a sufficient number of trained FFT teams to provide the required level of service and a strong infrastructure for implementing FFT as evidenced by high levels of model adherence/fidelity and because data from the National Gang Center's ongoing survey of law enforcement agencies identified Philadelphia as a city with chronically high levels of gang activity. This finding was corroborated in site visits in Philadelphia with members of the juvenile justice system and service providers. Based on these criteria, Philadelphia was selected and a Memorandum of Understanding to conduct the RCT was developed with the Family Court.

Participants

Participants were families of study-eligible youth whose cases were heard on the participating judge's docket between September 15, 2013 and February 4, 2016 and for whom the judge ordered family services. To be eligible for study inclusion, youth had to be an 11–17-year-old male³ and could not have been referred for FFT services in the past year.⁴

A total of 129 families participated in the study. Families were disproportionately of lower income. The median household income was \$17,500 and 44% of the sample had a household income below \$13,000. Fifty-eight percent (58%) of caregivers were currently working at the time of the pretest, and 83% reported receiving public assistance. The caregiver sample was 79% female, 80% African-American, 19% Hispanic/Latino, 25% married, with mean age 41.1 (SD = 8.4). The mean age of participating boys was 15.4 (SD = 1.4).

Consistent with our goal of targeting youth at risk for gang involvement, the study sample was slightly (4–5 months) younger and had also been involved in a higher percentage of crimes against persons (40.3 vs. 35.4%) than was typical of cases disposed in Philadelphia Family Court during the same period. The sample was also more likely to be non-Hispanic Black (78.4 vs. 68.3%).

³ Approximately 20% of the FFT clients served by the organizations we partnered with are female. Because we had no specific hypotheses related to gender differences in FFT effects, we could not justify the added expense of including enough females to allow for disaggregated analysis. Because we would not be able to assess gender differences, we limited the study to males.

⁴ Although we sought to include a population that was gang involved or at-risk for gang involvement, no attempt was made to screen individuals for gang involvement prior to study entry. Youth were deemed "at risk" for gang involvement solely on the basis of their residence in Philadelphia (a city with high gang prevalence) and their own prior criminal involvement.

Study Recruitment and Randomization into Research Conditions

Upcoming court dockets were scanned 2 weeks before each hearing date to identify study-eligible youth. For those eligible youth whom the participating judge deemed suitable for community services, she ordered "family services" as a condition of probation. Two members of the local research team, who were present each day in the courtroom, met in a private space with the parents/guardians and youth following the hearing to obtain parental consent and youth assent, and then conducted the pretest interviews with the consenting parent and child in separate offices. The caregiver and youth were each paid \$25 to complete the interview. If the family was unable to stay at the courthouse to complete the pretest interview, the researchers scheduled an appointment to administer the pretest at the home of the family within 2 weeks.

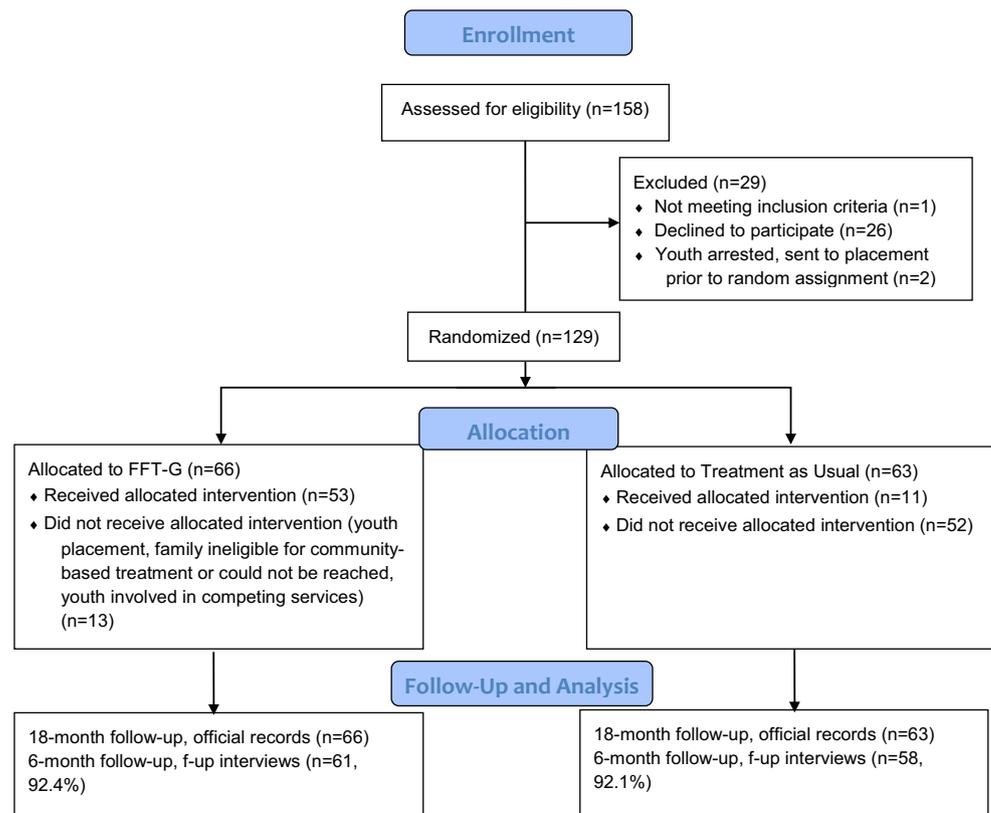
Following consent and pretesting, the families were randomly assigned to FFT-G or the alternative program (FTTP) by the research team using a list of random numbers previously computer-generated by the PI. Only the research manager and the PI had access to the random assignment list, and only the research manager consulted the list to carry out the random assignment. Randomization results were never communicated to field staff. Researchers prepared referral forms for the appropriate treatment (FFT-G or FTTP) to be processed by CBH, which handles all such referrals for court services and reimburses providers using Medicaid funds. CBH processed the referrals and assigned each family to one of the three participating FFT agencies (for treatment cases) or to the agency that provides FTTP. Researchers then informed the judge and the probation officers of the specific assignment.

Researchers tracked each case to ensure that FFT-G cases were assigned to the FFT-G trained therapists within each FFT agency. They continued to track all subjects over the subsequent 6-month period, at which time the local research team carried out the post-test interviews, generally in the homes of participating families. Figure 2 shows the flow of cases through the different phases of the study.

Data

Data come from four main sources. First, all participants (youth and caregiver) were interviewed at study intake and again at 6 months post-randomization. Post-test response rates for the interviews were 92% for youth and 90% for parents. Response rates were similar for treatment and control groups (92% for both treatment and

Fig. 2 Flowchart of participant enrollment and study participation



control youth and 88% FFT-G vs. 92% for control parents).⁵ Second, data on contacts with the juvenile justice system (the full history as well as subsequent contacts for the 18-month period following random assignment) were collected from Family Court records.⁶ Adult court records were also checked for the post-random assignment period. Records of residential placements were collected from court records. Third, data on community services received during the first 6 months following random assignment as well as the costs of those services were obtained from CBH. These data were augmented with records of community services paid through a special fund maintained by Family Court, as well as data on costs of residential placements provided by the Department of Human Services. Finally, data on FFT-G fidelity and adherence were obtained from a

computerized tracking system into which therapists entered information about each client contact.

Primary outcomes for the study include the two ultimate outcomes shown in Fig. 1: youth delinquency and substance use. These are measured using youth self-reports, parent reports, and official records of arrests, dispositions, and residential placements. Secondary outcomes include all mediators included in Fig. 1, and these are measured using adolescent and parent reports from the interviews. Alpha reliability coefficients, percentage missing, and documentation of the source and item content for each scale used as primary or secondary outcomes are shown in Table 1.

Analysis

Statistical Power

Based on an anticipated recidivism rate of 52% (Thornberry et al. 2003) and an expected ES of .58 (Alexander and Parsons 1982; Lee et al. 2012), we estimated that 142 subjects would be needed (assuming power of 0.8 and alpha of 0.05). The final number of families included in the study was 129. Because the number of cases is slightly smaller than anticipated, and because more recent ES estimates have been somewhat lower than those obtained in earlier studies, results from the study are regarded as meaningful if they reach the $p < .10$ level of

⁵ Characteristics of attriters were similar for treatment and control cases (e.g., there were no significant treatment by attrition interactions on any pretreatment variables for youth, and only one significant treatment by attrition interaction for parents on interview age: The control attriters were younger than their post-tested counterparts (35 vs 41) while the treatment attriters were older than their post-tested counterparts (45 vs 41). The number of days elapsed from randomization to post-test was also similar for treatment and control participants, ranging from 215 to 224 days elapsed.

⁶ All data from court records were double coded by two UM researchers and all discrepancies resolved. The level of inter-rater reliability agreement prior to resolving discrepancies ranged from 94 to 100% across the different items coded and was above 97% for all but one of the variables coded.

Table 1 Quality of interview-based measures

	S*	# of items	Alpha		% missing	
			Pre	Post	Pre ^a	Post
Delinquency						
General delinquency variety	Y	20	.68	.81	.8	.8
Violent delinquency frequency (trimmed)	Y	5	–	–	.8	.8
Substance use of adolescent						
Drug variety	Y	13	.62	.59	.0	.8
Marijuana frequency	Y	1	–	–	.0	.8
Alcohol frequency (trimmed)	Y	2	.89	.90	.0	.8
Drug variety	P	13	.53	.47	.8	.9
Marijuana frequency	P	1	–	–	1.6	.9
Peer influence						
Peer influence	Y	36	–	.90	–	3.4
Positive perception of peers	P	15	.89	.93	11.7	12.9
Normative beliefs about validity of rules/laws						
Attitudes unfavorable towards delinquency/drug use	P	23	.94	.84	1.6	.9
Attitudes unfavorable towards delinquency/drug use	Y	38	–	.90	–	.0
Constructive time use						
Adolescent activities—positive	P	14	–	.53	–	.9
Adolescent activities—negative	P	2	–	.68	–	.0
Family functioning						
Parenting skill	Y	22	–	.78	–	.0
Family environment	Y	27	–	.73	–	.8
Parenting skill	P	28	–	.73	–	.0
Family environment	P	27	–	.78	–	.0
Parent substance use						
Drug variety	P	13	.49	.47	1.6	.9
Alcohol frequency	P	2	.65	.72	1.6	.9

*S, source; P, parent interview; Y, youth interview

^a“–” indicates the scale was not scored at pretest

statistical significance rather than the more conventional $p < .05$ level. At $p < .10$, the minimum detectable ES given the available number of cases is $d = .49$. Using a p -level of .10 is reasonable in this study given the prior expectation of a positive effect of the intervention. Although this practice is considered acceptable in experimental research that balances the probability of type I and type II errors (Cohen 1992; Weisburd et al. 1993), exact p -levels are reported for those who wish to apply a more conservative test.

Outcome Analysis

The distributional qualities of all outcome measures were examined and extreme outliers were trimmed for a small number of scales. The pretreatment equivalence of the treatment and control group members was assessed using mean comparisons and t tests. An “intent to treat” (ITT) approach was used to compare outcomes for study groups. Regression

models were run using the model most appropriate for each outcome (e.g., logistic regression for binary outcomes, negative binomial or Poisson regression for count outcomes, and OLS regression for normally distributed outcomes). The model for each dependent variable included a dummy variable measuring assignment to the treatment condition, variables that differed significantly between the treatment groups at pretest, and the pretreatment measure of the outcome variable when available. When no pretreatment measure of the outcome variable was available (see Table 1), all significant pretest predictors of the outcome were included as control variables. These models were used to generate adjusted means for each outcome. For continuous outcome measures, standardized mean difference effects size statistics (d) were calculated using the difference between the treatment and the control group adjusted post-test mean in the numerator and the standard deviation for the corresponding unadjusted post-test measures in the denominator. Odds ratios are presented for binary outcomes.

Results

Implementation

FFT-G was delivered by six trained family therapists, two from each of the three participating agencies. All therapists were experienced FFT therapists and their agencies had been previously certified to deliver FFT. The additional training for FFT-G consisted of 12 h of training spread over 2 days⁷ and provided by the developer of FFT, and assisted by the national consultant who provided weekly supervision during the implementation phase. All six therapists were in attendance for the entire training session. A 1-day follow-up training was provided by the national trainer approximately 2 months after the initial training.

Eighty percent ($N = 53$) of FFT-G cases received at least one FFT-G session, and 53% ($N = 35$) successfully completed the program. The most common reason for not beginning FFT-G was that the youth was placed in a residential facility prior to the first contact. The average months involved in the program was 2.6 (range 0–6.3), and the average number of completed contacts recorded by the therapists was 12.6 (range 0–39). Excluding cases who did not begin FFT-G, the average months involved in the program was 3.2 (range .8–6.3), the average number of completed contacts recorded by the therapists was 15.4 (range 2–39), and the average number of FFT-G sessions was 8.7 (range 1–14). Among clients who did not successfully complete the program ($N = 18$), the average number of FFT-G sessions was 4.3 (range 1–10). The national consultant rated fidelity for each case reviewed in weekly supervision meetings. The average fidelity rating for all clients who began FFT-G was 4.1 out of 6.

The implementation of FFT-G was similar to implementation of regular FFT in Philadelphia. Interviews with the national trainer, the project liaison who observed most weekly supervision meetings, and the therapist who handled the largest number of families all agreed that the delivery of FFT-G was similar to typical FFT in terms of the delivery schedule and clientele. Although it was anticipated that FFT-G cases might require more intense contact during the engagement phase, records of contacts prior to the first session showed that the number of such contacts was actually lower for the

participating therapist's FFT-G cases compared with their regular FFT cases treated during the same time period (4.24 for FFT-G vs. 4.74 for regular FFT). The main difference between FFT-G and FFT was that, because FFT-G caseloads were smaller than the typical FFT caseload, the number of cases discussed during weekly supervision sessions was smaller (2–3 vs. 12–15), and therefore the therapists received more intensive feedback for their cases. FFT-G resembled regular FFT in the percentage successfully completed during the same time frame (53.0 vs. 49.6%).

The Medicaid funding mechanism that supported FFT-G service delivery required some adaptations to the usual FFT model. Potential clients were required to undergo a psychological evaluation that indicated behavioral health needs and treatment planning, and an Interagency Service Plan Team meeting was required. These requirements were not part of the FFT model. They proved onerous to the providers and resulted in the loss of some potential clients. Additionally, some of the services regularly delivered under the FFT model (such as collateral contacts) were not billable under the Medicaid mechanism. Underutilization of FFT services and inability to bill for some services contributed to the decision by one of the three providers to drop FFT in March 2015. The remaining therapist from the agency that dropped out was immediately hired by one of the continuing agencies to avoid any service interruption.

FTTP, the family service to which control youths were referred, was far less successful at engaging families in therapy than FFT-G. As indicated in Fig. 2, only 11 families were successfully engaged.⁸ The probation officers and the participating judge, who reviewed data on engagement in therapy prior to status hearings, subsequently referred several control families to regular FFT when it became clear that they were not receiving services from FTTP. Of the 63 control families, 13 (20.6%) received FFT.⁹

Treatment Context

Families receiving FFT-G and FTTP were concurrently receiving a range of other services. CBH records of payments for Medicaid-covered services provided during the 6 months following random assignment are provided in Table 2. A majority of families in both groups received some treatment services during this period, but a higher

⁷ Two trained research assistants documented the content of the initial training by coding, for each ten minute period, what content had been covered in the period. The level of inter-rater agreement across time points for the initial training was 86.8%. The training consisted primarily of a review of the gang context in Philadelphia, gang research and risk and protective factors relevant to gang-involved populations, and a review of each stage of the FFT model with specific attention to special accommodations for gang-involved populations. The most common activity during the training was role playing the handling of specific issues that were anticipated to come up in sessions involving gang-involved youth (30% of time periods). The FFT-G manual, developed by the FFT developer's team, formed the basis for the training and was provided to each therapist and supervisor. Three of the six trained therapists handled 85% of the cases.

⁸ The level of engagement observed for FTTP is typical for such programs when implemented with high risk families. FFT's level of engagement is far higher than is typically obtained because FFT, like other EB family therapy programs, includes a major emphasis on engagement. Also, FFT therapists were always willing to meet the families in their homes, while FTTP used a combination of home- and office-based meetings.

⁹ One of these families was inadvertently assigned to an FFT-G-trained therapist. The others were assigned to regular FFT therapists.

Table 2 Treatment services received and related costs according to Medicaid billing records, by treatment status

% youth receiving each of the following services...	FFT-G (N = 66 ^a)	Treatment as usual (N = 63)
FFT	85.9	22.2
Evaluation	59.4	28.6
Detention	26.6	27.0
Mental health outpatient	26.6	39.7
Residential ^b	25.0	31.8
Drug/alcohol treatment	12.5	14.3
Drug testing	12.5	15.9
Case management & other community services	7.8	7.9
Medication management	4.7	4.8
Acute patient/partial	1.6	1.6
Crisis intervention	1.6	1.6
Any services	97.0	73.0
Cost of services...	FFT-G (N = 66)	Treatment as usual (N = 63)
Residential ^b	\$278,008	\$312,419
FFT	\$154,718	\$35,911
Detention	\$147,898	\$141,859
Grant-related costs	\$19,977	\$390
Evaluation	\$16,970	\$8378
Drug/alcohol treatment	\$12,296	\$10,923
Case management & other community services	\$12,071	\$24,609
Mental health outpatient	\$8089	\$26,425
Crisis intervention	\$936	\$468
Drug testing	\$855	\$1839
Medication management	\$452	\$374
Acute patient/partial	\$318	\$5337
All services	\$652,588	\$568,930
Per youth (inc. unserved youth)	\$9888	\$9031
Per youth served	\$ 10,197	\$ 12,368

CBH Medicaid reimbursement records for services provided during 6-month period following random assignment. Costs are summed across all subjects who received each service

^a Two subjects received services, but no data are available on type of service or cost. The percentage receiving “any services” uses a denominator of 66. All other service categories use a denominator of 64

^b Includes all services paid for CBH while youth was in residential care, regardless of the location in which the service was provided

percentage of treatment cases received at least one service (97 vs. 73%).¹⁰ A much higher percentage of treatment cases received FFT-G (86 vs. 22%) and evaluation (59 vs. 28%), which is required for Medicaid reimbursement of FFT services. The control cases were more likely to receive mental health outpatient treatment (40 vs. 26%), mainly because FTTP is included in this category, and the control cases were somewhat more likely to receive residential placement (32 vs. 25%). Importantly, the table shows that the study population was deeply involved in

Philadelphia’s social service system, receiving numerous services concurrently with FFT-G.

Costs

The costs of services received during the 6 months following random assignment are displayed in Table 2. These costs include the amounts paid by CBH for each service, minimal costs paid from a “special fund” administered by the Court for FFT clients not eligible for Medicaid, and costs paid by the study to reimburse FFT LLC and the local service providers for the cost of weekly supervision of the FFT-G therapists and for FFT-G training. Costs of residential stays during the same 6-month period are also included in the table. The table shows

¹⁰ This is consistent with post-treatment caregiver self-reports of treatment services received in the past six months: Treatment and control caregivers reported receiving 6.5 (SD = 5.3) vs 3.6 (SD = 5.6) different services (*p* < .01).

that the total cost of all services provided to study youth during the 6-month period following random assignment was approximately \$1.25 million. More dollars were spent on FFT-G youth than on control youth (\$653K vs. \$569K), primarily because a larger percentage of FFT-G youth received services. The cost per youth served was lower for FFT-G youth than for control youth (\$10,197 vs. \$12,368) despite the added cost of FFT-G services (costs paid for FFT-G direct services were \$2763 per youth who received FFT-G¹¹). This cost differential is largely explained by the greater use of residential placement for control than for treatment youth. Two other service categories, mental health outpatient and case management, also added substantially to the cost of services for control group members. The main conclusion from this analysis is that FFT services replaced more expensive services to a greater extent for treatment than for control youth, thereby reducing the cost per youth served.

Outcomes

Baseline Comparisons

Comparison of baseline characteristics across the experimental groups (available online) shows no significant group differences on demographic characteristics or on data from court records. No group difference on parent-reported outcomes or mediators reached statistical significance. None of the adolescent-reported mediators differed across groups, but differences on four interview-based measures were significant or marginally significant at pretest.¹² Treatment group youth reported higher levels of delinquency and violent delinquency (a subset of items in the delinquency scale), and a greater variety of hard drugs used in the past 6 months. On the other hand, a higher percentage of control youth reported having spent time in a residential facility during the past 6 months (74 vs. 52%). The pretreatment scales that differed across groups are included as covariates in all outcome analyses.

Self-Reports

Table 3 shows adjusted means for all primary outcomes and mediators measured through interviews conducted 6 months post-random assignment, by experimental group. No significant differences were observed among measures of the primary outcomes, delinquency and substance use, or the mediators targeted by FFT-G. Most ESs are trivial. However, the ESs for frequency of alcohol use ($d = -.27$) and the percent placed in a

residential facility during the past 6 months ($d = -.20$), although small, favored the treatment group.

Official Records

Table 4 shows recidivism outcomes from official records separately by treatment period. The top panel compares FFT-G with controls for the first 6 months following random assignment. The middle panels show the same comparison for months 7 through 18, after FFT-G services were completed. The bottom panel shows the entire 18 month study period.

During the first 6-month period, there was relatively little recidivism activity. Less than 20% of study participants were arrested, and approximately half of them were adjudicated delinquent. Most of the recidivism measures favored the FFT-G group, and the magnitude of some of the differences was large. For example, the percentage adjudicated delinquent was approximately 2.5 times greater for the TAU than the FFT-G cases (15 vs. 6%). The percentages with property charges and adjudicated delinquent were marginally significant (each $p < .06$).

During the year following treatment, all of the recidivism measures favored the FFT-G cases. The percentage with drug charges was significantly higher for controls than for FFT-G cases (13 vs. 8%, $p = .046$). Although not statistically significant, a practically meaningful difference favoring the FFT-G cases in the days spent in residential placement¹³ emerged (155 vs. 100 days, $ES = -.41$).

During the entire 18-month follow-up period, all of the recidivism measures again favored the FFT-G cases. Significant or near-significant differences were found for the percentage with drug charges (11 vs. 22%, $p < .05$), the percentage adjudicated delinquent (23 vs. 38%, $p < .05$), and the percentage with property charges (14 vs. 23%, $p = .06$). Again, a practically meaningful difference favoring the FFT-G cases in the days spent in residential placement was observed (191 vs. 135 days, $ES = -.31$).

Limitations

The largest limitation to this study has already been discussed. The study would have been stronger if there had less contamination across study conditions. As noted, 20% of FFT-G subjects did not receive FFT-G, and 21% of control subjects received FFT. This contamination most likely resulted in an understatement of FFT-G effects because subjects were treated in all analyses as they had been assigned rather than according to the services they actually received.

¹¹ This FFT cost per youth served is somewhat lower than the \$3263 reported in Lee et al.'s (2012) report on cost-effectiveness. The cost of FFT in Philadelphia may be lower because some of the required FFT services (such as collateral contacts and consultancies) are not covered by Medicaid funding.

¹² Three to four differences significant at $p < .05$ would be expected by chance across the 65 tests conducted.

¹³ Residential placements include all non-home confinements that involved at least one overnight stay and that were ordered chronologically after the randomization date and within the 18 month follow-up period.

Table 3 Post-test mediators and outcomes from interviews, adjusted, by treatment group

Scale	S*	Adjusted post-test mean					Effect size	Odds ratio
		Treatment	(n)	Control	(n)	p-level		
Delinquency								
General delinquency variety	Y	.09	(60)	.08	(57)	.303	.08	–
Violent delinquency frequency ^a	Y	3.43	(60)	3.09	(57)	.392	.06	–
% arrested or picked up by police in past 6 mos	Y	38.33	(60)	35.09	(57)	.876	.08	1.07
% in residential past 6 mos	Y	38.33	(60)	47.37	(57)	.252	–.20	.62
Substance use of adolescent								
Drug variety	Y	1.15	(60)	1.16	(57)	.794	–.006	–
Marijuana frequency	Y	2.05	(60)	1.88	(57)	.562	.06	–
Alcohol frequency ^a	Y	.54	(60)	.94	(57)	.142	–.27	–
Drug variety	P	.43	(56)	.43	(56)	.283	.00	–
Marijuana frequency	P	1.21	(56)	1.01	(55)	.730	.09	–
Peer influence								
Peer influence	Y	2.21	(57)	2.13	(55)	.636	.16	–
% currently in gang	Y	3.33	(60)	5.26	(57)	.174	–.27	.17
Positive perception of peers	P	.69	(41)	.61	(47)	.726	.28	–
Normative beliefs about validity of rules/laws								
Attitudes unfavorable toward delinquency/drug use	P	3.41	(55)	3.4	(56)	.752	.03	–
Attitudes unfavorable toward delinquency/drug use	Y	.58	(61)	.60	(57)	.696	–.13	–
Constructive time use								
% enrolled in school	Y	93.44	(61)	96.49	(57)	.811	–.37	.77
Days/week attend school	Y	4.21	(61)	4.42	(57)	.439	–.13	–
Adolescent activities—positive	P	7.29	(58)	7.70	(56)	.654	–.18	–
Adolescent activities—negative	P	.94	(56)	.99	(56)	.815	–.06	–
Family functioning								
Parenting skill	Y	3.20	(60)	3.34	(57)	.128	–.34	–
Family environment	Y	.74	(60)	.75	(56)	.662	–.03	–
Parenting skill	P	3.30	(55)	3.36	(57)	.256	–.24	–
Family environment	P	.77	(57)	.75	(57)	.477	.17	–
Parent substance use								
Drug variety	P	.87	(55)	.93	(56)	.925	–.06	–
Alcohol frequency	P	1.84	(55)	1.32	(56)	.996	.29	–

Adjusted means are predicted values from regressions that control for the three variables that differed significantly between the treatment groups at pretest (general delinquency variety, % in residential, and hard drug variety) and the pretreatment measure of the outcome variable, when available. When no pretreatment measure of the outcome variable is available, all significant pretest predictors of the outcome are included as control variables. ES estimates are standardized mean differences for continuous outcomes and odds ratios for binary outcomes

*S, source; P, parent interview; Y, youth interview

^a One extreme outlier trimmed

The study was limited to males residing in one city at one point in time. The results are therefore not generalizable to other groups. Finally, the study would have been stronger if we had conducted longer-term follow-up interviews. Because effects measured in the official records increased over time, a longer follow-up period for self-reports might have registered effects. A longer term follow-up would also have enhanced our ability to assess the mechanisms through which FFT-G influenced outcomes measures at the 18-month mark.

Discussion and Conclusions

This study tested the effects of FFT accommodated for a sample of court-involved, gang-at-risk or gang-involved youth in Philadelphia’s Family Court. It found that FFT-G was effective for reducing subsequent crime as recorded in official records. Because FFT-G, as implemented, was very similar to regular FFT, it is likely that either version of the program would have produced these effects. Additional large-sample

Table 4 Recidivism from official records, adjusted, by treatment group

	Recidivism during the first 6 months					Effect size	Odds ratio
	FFT-G Mean	(n)	Treatment as usual Mean	(n)	p-level		
% arrested	15.15	66	17.74	62	.636	–	.77
# arrests	.17	66	.21	62	.521	–.09	–
% with felony charges	10.61	66	13.33	60	.233	–	.42
% with person charges	7.58	66	6.67	60	.291	–	.34
% with property charges	6.06 ⁺	66	10.00	60	.056	–	.09
% with drug charges	3.03	66	8.33	60	.481	–	.53
% adjudicated delinquent	6.06 ⁺	66	15.00	60	.055	–	.23
% with residential stays	34.85	66	32.26	62	.912	–	1.05
Days in residential placement	37.46	66	36.81	62	.946	.01	–
Recidivism during months 7 to 18							
	FFT-G Mean	(n)	Treatment as usual Mean	(n)	p-level	Effect size	Odds ratio
% arrested	24.24	66	30.64	62	.232	–	.58
# arrests	.30	66	.39	62	.178	–.14	–
% with felony charges	18.18	66	23.33	60	.285	–	.59
% with person charges	12.12 ^a	66	18.33	60	.516	–	.70
% with property charges	7.58	66	15.00	60	.223	–	.46
% with drug charges	7.58*	66	13.33	60	.046	–	.20
% adjudicated delinquent	18.18	66	25.00	60	.243	–	.57
% with residential stays	56.06	66	61.29	62	.408	–	.72
Days in residential placement	99.78	66	154.90	62	.200	–.41	–
Total Recidivism							
	FFT-G Mean	(n)	Treatment as Usual Mean	(n)	p-level	Effect Size	Odds Ratio
% arrested	34.85	66	46.77	62	.106	–	.52
# arrests	.47	66	.60	62	.150	–.17	–
% with felony charges	25.76	66	35.00	60	.106	–	.49
% with person charges	18.18	66	23.33	60	.386	–	.65
% with property charges	13.64 ⁺	66	23.33	60	.060	–	.34
% with drug charges	10.61*	66	21.67	60	.037	–	.28
% adjudicated delinquent	22.73*	66	38.33	60	.029	–	.38
% with residential stays	59.09	66	61.29	62	.708	–	.86
Days in residential placement	135.16	66	191.08	62	.287	–.31	–

Adjusted means are predicted values from regressions that control for the three variables that differed significantly between the treatment groups at pretest (general delinquency variety, % in residential, and hard drug variety), the pretreatment measure of the outcome variable, and any additional pretreatment measures that predicted the outcome measures. ES estimates are standardized mean differences

* $p < .05$, + $p < .10$

research would be required to understand the extent to which the effects of FFT differ from those of FFT-G.

The study found that the intervention was implemented with fidelity to the FFT model. Medicaid funding provided stability in the treatment delivery system and provided a reliable source of EB community services for the Court and participating families. However, the use of Medicaid funding required activities unrelated to the FFT model adding to the cost of FFT and sometimes limiting family engagement in therapy. Also, some activities required by FFT were not

billable under Medicaid funding. The novel funding approach examined in this study was found to be helpful for broadening the reach of EB services, but other states wishing to adopt this approach would be wise to attempt to avoid adding non-model-related requirements and to find ways to fully fund model-specific requirements.

Although the Medicaid funding increased FFT's reach, the effort was limited due to low judicial buy-in to the idea of replacing residential services with less restrictive community services. The participating Judge was unwilling to include in

the study many youths who met the eligibility criteria but whom she deemed too risky to assign to community rather than more restrictive (and costly) residential treatment. Also, many study youths either never received their assigned treatment or had their assigned treatment discontinued when they were subsequently placed in a residential setting, most often due to noncompliance with probation terms. Further, as indicated above, one of the three treatment providers stopped providing FFT services due to underutilization of FFT in Philadelphia. These facts all reflect a reluctance on the part of Philadelphia judges to order youths to receive community-based services as opposed to residential placement. This mindset continues despite evidence suggesting that community services are more effective at a lower cost, as we found in our study.

The low level of judicial support for less restrictive treatment of juveniles in Philadelphia is well-documented. Pennsylvania ranks third in the nation for the number of court-committed youth in residential placement, just behind California and Texas (Sickmund et al. 2017). Philadelphia accounts for more than a quarter of all placement in Pennsylvania.¹⁴ Although having a secure source of funding for FFT did solve some of the problems related to expanding the reach of EB practices in Philadelphia, greater benefit would be realized if a higher level of buy-in were achieved among the Judges, who have ultimate jurisdiction over these matters.

The study found that FFT-G was effective for reducing recidivism measured in official records. Treatment control differences in these measures increased after the 6-month period when the treatment was being delivered. By 18 months following random assignment, all of the recidivism measures favored the FFT-G cases, and several of the differences between groups were significant or close to significant. The magnitude of the effects observed in measures from official records, although not always statistically significant by the conventional standard of $p < .05$, are comparable to those found in other studies of FFT. Hartnett et al. (2016a) report ES's ranging from .20 to .48 from RCTs. All outcomes we identify as positive effects have ES's within that range. We therefore conclude that FFT-G achieved similar outcomes on measures of official recidivism as have been reported in previous studies of FFT. FFT-G seems to be as effective as FFT, and seems to be effective for reducing recidivism under contemporary conditions, with an urban, predominantly minority population selected for its high risk for gang involvement.

Interview measures collected at the 6-month point did not show significant differences between treatment and control cases. The absence of effects on the outcomes measured in

the parent and youth interviews may be due to the fact that the interviews were conducted too close to the end of treatment to register changes that were still developing. Recall that the official records showed generally low rates of recidivism during the first 6-month period, and most differences between the treatment and control groups were not significant during this period. The interviews, conducted at the 6-month point, may have been conducted too early to be able to detect differences that appeared to be increasing over time. All of the study youth were under intense probation surveillance during the first 6 months. The beneficial effects of the treatment were most evident after the intense surveillance period ended and the treatment cases had to exercise their new skills to keep out of trouble. Although we expected to observe effects on the mediators targeted by FFT-G at the 6-month time-point, it may be the case that these targeted attitudes and behaviors were still in flux at the time of the interview.

Another possibility is that the positive effects observed were due at least in part to unmeasured mediators. FFT therapists advocate for more lenient decisions for cases currently receiving FFT. They often attend status hearings with the youth and actively advocate for the youth. We know that the participating Judge was particularly attuned to program engagement. Some evidence suggests that the lower rate of adjudication for FFT clients was due at least in part to judicial discretion. Arrest during the interval during which FFT was provided resulted in lower rates of adjudication for FFT-involved youth than for those not receiving FFT, after controlling for crime type (firearms, felony) and client prior behaviors (number of adjudicated charges and number of firearm charges).¹⁵ Importantly, this mechanism cannot explain all of the positive study results because we also observed significant differences on later arrests, which could not be influenced by advocacy, but it suggests that the mechanisms leading to recidivism reduction may be more complex than anticipated.

Very few previous studies have assessed the mechanisms through which FFT achieves its effects on crime outcomes. The findings from these studies provide conflicting evidence about the extent to which FFT operates through the expected mechanisms. Slesnick and Prestopnik (2009) found no effects on measures of parent and family mediators. Hartnett et al. (2016b) found that FFT improves family adjustment. Humayun et al. (2017) found no effects on positive parenting variables. Our finding of no effects on hypothesized FFT-G mediators suggests that future research on FFT (and family therapy more generally) should further investigate the timing of effects as well as the mechanisms leading to effects.

The study's recommendations for policy makers and practitioners are clear: public funding streams such as Medicaid

¹⁴ [http://www.jcjc.pa.gov/Research-Statistics/Disposition%20Reports/2016%20Pennsylvania%20Juvenile%20Court%20Disposition%20Report%20\(PDF\).pdf](http://www.jcjc.pa.gov/Research-Statistics/Disposition%20Reports/2016%20Pennsylvania%20Juvenile%20Court%20Disposition%20Report%20(PDF).pdf)

¹⁵ 19.5% of those receiving FFT were convicted compared with 33.6% of those not receiving FFT. ($p < .10$, OR = .489).

can be used to expand the reach of EBs to at-risk populations, and improving the local infrastructure supporting EBs will increase the pay-off for doing so. Expanding the use of programs such as FFT-G can be expected to reduce youth recidivism and conserve public dollars. Our study demonstrated that court-involved youth are heavily involved in social service systems. Three-fourths of control group members were receiving at least one MEB service, paid for by public funds. The cost of these services is high. Our study demonstrated that youth who receive FFT-G are less likely to receive alternative, more costly, public services (such as residential placement) during the time they are receiving FFT-G. In this study, using FFT-G reduced the costs of services per youth served by more than \$2 k per youth in the 6-month period for which services were monitored and the savings could have been greater with more judicial buy-in. This direct cost savings underestimates the total cost savings that can be expected from increased use of EBs. As we demonstrated, FFT-G reduces recidivism during at least the first 18 months following random assignment. Such crime reductions result in future cost savings. Our results suggest that FFT-G improved youth behavior in a high risk, minority population at a large present-day cost savings to the criminal justice system. This cost savings can be expected to grow over time. As such, we recommend that other states find ways, as Pennsylvania has, to deliver EB practices with fidelity using public funding streams such as Medicaid.

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Compliance with Ethical Standards

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent or assent was obtained from all individual participants included in the study.

Conflict of Interest The authors declare that they have no conflict of interest.

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