



Cost analysis of the strengthening families program in reducing time to family reunification among substance-affected families

Michelle Johnson-Motoyama^{*}, Jody Brook, Yueqi Yan, Thomas P. McDonald

University of Kansas, School of Social Welfare, Twente Hall, 1545 Lilac Lane, Lawrence, KS 66044-3184, United States

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ABSTRACT

Decision makers typically face uncertainty in determining whether the outcomes of promising child welfare interventions justify the investment. Despite repeated calls for cost analysis in child welfare, original studies that evaluate the costs and effects of child welfare programs have been limited. Moreover, no cost analyses have focused on family reunification programs that address the needs of substance-affected families. The purpose of this study was to evaluate the costs and effects of a federally funded implementation of the Strengthening Families Program (SFP), a 14-week family training curriculum, on time to reunification with a substance-involved child welfare population. Based on event history analysis, we find the typical child participating in SFP spends 190 fewer days in out of home care when compared to a propensity score matched comparison group of children in out-of-home care receiving treatment as usual. Re-entry rates between the two groups were not significantly different at follow-up. At an average out-of-home care rate of \$86 per child per day in this state, SFP saves approximately \$16,340 per participating child in out-of-home care costs. From a cost-benefit perspective, every \$1 invested in SFP yields an average savings of \$9.83 in this Midwestern demonstration.

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1. Introduction

1.1. Background

The presence of caregiver alcohol and other drug abuse has been well established in the literature as an antecedent to child welfare system involvement (Testa & Smith, 2009). While the presence of substance abuse in child welfare cases is well documented, effective programmatic responses are only beginning to emerge. In an attempt to address this key risk factor, the Child and Family Services Improvement Act of 2006 (P.L. 109–288), the Promoting Safe and Stable Families program and Section 437 of the Social Security Act (42 U.S.C. 629 g) authorized federal funding to target assistance to improve well-being and permanency for substance abuse affected children in the child welfare system. Fifty-three regional partnership grants (RPG) were awarded following a competitive application process through this legislation. Subsequently, States, Tribes and localized community stakeholders implemented a wide range of demonstration activities in an attempt to improve community capacity, child well-being and child welfare system outcomes. While some grants were short term, the majority of funding was for 5-year demonstration projects, which ran from the time period 2007–2012. The provision of parenting skills training and education was identified as a

key strategy for 83% of the grantees, and 59% of the grantees implemented a specific family strengthening program or curriculum (U.S. Department of Health and Human Services, Administration for Children and Families, 2006).

A majority of the grantees implemented specific parenting programs; however, the choice of program and manner of implementation varied tremendously. For example, a review of summaries of the awarded grants reveals service delivery of parenting programs through a multitude of contexts, including family drug courts, as an adjunct to substance abuse treatment, and as a component of child welfare services as usual (which can include a wide array of service components). Some sites implemented parenting programs with children at-risk of out of home placement, while others implemented program with families whose children were in foster care (U.S. Department of Health and Human Services, Administration for Children and Families, 2006).

In addition to determining the effectiveness of these programs, evaluating these programs from the perspective of long term sustainability is critically important. Even if a program is effective, if it is too expensive to administer, or the logistics of administration are too cumbersome for the population of interest, then the effort expended during the program demonstration is wasted. A critical piece of evaluating sustainability is the evaluation of the costs to adopt and implement targeted programs and services. As a requirement of the RPG funding, all sites were required to develop sustainability plans, and in the case of this demonstration, cost analysis became one component of that plan. As a part of the RPG experience, these researchers noted that interest in adopting

^{*} Corresponding author. Tel.: +1 785 864 2378; fax: +1 785 864 5277.

E-mail addresses: michellejm@ku.edu (M. Johnson-Motoyama), jbrook@ku.edu (J. Brook), yueqiyang@ku.edu (Y. Yan), t-mcdonald@ku.edu (T.P. McDonald).

“evidence-based” programs, variously defined, had proliferated among decision makers in an array of human service arenas including child welfare, substance abuse treatment settings, and family drug courts. While evidence-based approaches promise a positive return on taxpayer investment by identifying programs that effectively achieve the overarching goals of child welfare, substance abuse treatment, and judicial systems (Lee & Aos, 2011), evaluation of programs from a cost perspective is also necessary to determine whether an intervention is a good use of limited financial resources (Foster, Dodge, & Jones, 2003), particularly in an era marked by government retrenchment in spending. In this sense, cost analysis can be used to support decision-making by signaling those interventions that hold promise for achieving policy objectives in the context of available resources.

Despite repeated calls for economic evaluation in child welfare, original research studies that evaluate the costs and effects of child welfare programs have been limited (Corso & Lutzker, 2006; Goldhaber-Fiebert, Snowden, Wulczyn, Landsverk, & Horwitz, 2011; Maher, Corwin, Hodnett, & Faulk, 2012). The paucity of studies in this area have been attributed largely to limited information regarding program costs, measurement of relevant outcomes, and a general lack of feasibility (Goldhaber-Fiebert et al., 2011; Kaplan, 2012). To date, no cost studies have focused on reunification programs that address the needs of families with substance abuse concerns.

1.2. Family reunification among substance abuse affected families in child welfare

In child welfare, family reunification typically refers to the process of returning children placed in temporary out-of-home care to their families of origin (Children's Bureau, 2011). Over the past 30 years, family reunification has been both strengthened and diminished through a number of legislative, funding, and practice measures (Child Welfare League of America [CWLA], 2002; Wulczyn, 2004). Nonetheless, it remains the primary permanency goal for roughly half of all children in foster care (Children's Bureau, 2011), and among those with a permanency goal of reunification, reducing time in foster care to reunification without increasing re-entry remains one of seven national outcomes to which state child welfare administrations are held accountable (Children's Bureau, 2010). Parental substance abuse has been estimated as a factor in 40% to 60% of all child welfare cases, and its presence in a case has been found to lengthen the time to reunification for children in foster care (Brook, McDonald, Gregoire, Press, & Hindman, 2010), and to increase placement instability (Brook & McDonald, 2009).

Over the years, researchers and policymakers have sought to identify child welfare practices and programs that influence the likelihood of family reunification and its timing (Children's Bureau, 2011; CWLA, 2002; Lee, Aos, & Miller, 2008; Littell & Schuerman, 1995). At the system level, prior research has identified factors that support family reunification such as flexible agency funding, enhanced cooperation with the courts, and stable, competent staff (Children's Bureau, 2011). Research reviews have identified relationships between the frequency of caseworker contact with the family and family reunification (Cheng, 2010; Children's Bureau, 2004; Farmer, 1996; Littell & Schuerman, 1995). At the parent/consumer level, the frequency of parent-child visitation (Davis, Landsverk, Newton, & Ganger, 1996; Leathers, 2002); the involvement of foster parents (Lewis & Callaghan, 1993) and the involvement of parent advocates (Berrick, Cohen, & Anthony, 2011; Marcenko, Brown, DeVoy, & Conway, 2010; Romanelli et al., 2009) have all been associated with reunification outcomes. Studies have also identified the provision of concrete services (Cheng, 2010; Choi & Ryan, 2007; Rzepnicki, Schuerman, & Johnson, 1997) and home-based services as promising strategies, though research on home-based services has yielded inconclusive findings with regards to their effectiveness (Lewis, Walton, & Fraser, 1995; Littell & Schuerman, 1995; Walton, 1998). Yet within this growing literature,

research on the impact of child welfare services on family reunification among substance affected families has been limited (Marsh, Smith, & Bruni, 2011; Testa & Smith, 2009).

In a Title IV-E waiver evaluation that utilized a randomized control design, Ryan and colleagues (Ryan, Choi, Hong, Hernandez, & Larrison, 2008; Ryan, Marsh, Testa, & Louderman, 2006) found that parents assigned a recovery coach responsible for coordinating standard substance abuse service plus a package of enhanced services were somewhat more likely than parents receiving standard services alone to achieve reunification. Family Treatment Drug Courts have been associated with increased chances of family reunification (Boles, Young, Moore, & DiPirro-Beard, 2007; Green, Furrer, Worcel, Burrus, & Finigan, 2007; Worcel, Furrer, Green, Burrus, & Finigan, 2008) while studies of comprehensive services have yielded mixed results. In a study of comprehensive services in Illinois, reunification rates were highest for parents who had addressed other pressing mental health, housing, and domestic violence problems (Marsh, Ryan, Choi, & Testa, 2006). Moreover, a California-based study found that mothers who attended treatment programs providing more comprehensive services to address multiple service needs were more likely to achieve reunification than were mothers who attended programs offering fewer ancillary support services (Grella, Needell, Shi, Hser, 2009). However, a Midwestern evaluation of a comprehensive substance abuse services program for parents with children in foster care found that program participants took longer to reunify and were more likely to reenter foster care than were comparison families who received standard services (Brook & McDonald, 2007).

As mentioned, the federal government funded interventions at numerous sites across the country to enhance research and services related to substance involvement and child welfare. The Strengthening Families Program (SFP) was implemented in this Midwestern state over the course of a 5-year grant to the Children and Family Services (CFS) division of the State's social and rehabilitative services (SRS). In the initial evaluation, a greater proportion of SFP participants achieved family reunification when compared to propensity score matched families who did not receive the intervention (Brook, McDonald, & Yan, 2012). During the initial follow-up period, the proportion of SFP participants returning to out-of-home care was no different from that of the comparison group. When programs such as SFP demonstrate promising results that warrant further testing, decision makers typically face uncertainty in determining whether the ends justify the means, particularly in the context of ongoing program operations. The purpose of this study was to demonstrate the costs and effects of the provision of the Strengthening Families Program (SFP) on family reunification among substance affected families in the child welfare system in this Midwestern state.

While the SFP was developed specifically for the substance abuse affected population, it is important to note that the program is not centered on traditional alcohol or other drug treatment or education: just one of 14 program sessions focus on substance use and abuse. Rather, the program focuses on family skills and family strengthening, which has been found to reduce drug use and influence various intermediate risk factors such as conduct disorders, aggression, and family conflict (SAMHSA, 2012). Furthermore, improved social competency, increased peer resistance, and enhanced family organization have all been demonstrated through interventions with a family focus (Biglan & Taylor, 2000; Kumpfer & Alvarado, 2003; Taylor & Biglan, 1998). The use of SFP was initiated after a review of available evidence related to parenting and family based interventions in 2006 by two of the authors of this article (Brook and McDonald), and a determination of the appropriateness of the fit of various interventions for the local setting. The researchers conducting this analysis have no affiliation with the program developer of the SFP, and have no direct or indirect financial or other interest in the promotion or utilization of the SFP. The evaluation of SFP received human subject's approval from the University of Kansas Institutional Review Board.

2. The strengthening families program

2.1. Intervention

The Strengthening Families Program (SFP) is a family skills training program that was developed in the early 1980s by Karol Kumpfer. The SFP curriculum consists of sessions on child development, behavior management techniques, child skills training, family skills enhancement and attachment/bonding, parental supervision, and psycho-educational material targeted at improving the parent–child relationship. SFP is theoretically based on Patterson's (1976) behavioral parenting model, Shure and Spivak (1979) Social Skills Training Program, and Forehand and McMahon's (1981) curriculum for helping the non-compliant child. The program has been refined over the 30 years since its original development; a full description of the program is available through the Substance Abuse and Mental Health Service Administration's (SAMHSA) National Registry of Evidence Based Programs and Practices website (see <http://www.nrepp.samhsa.gov>). The SFP curriculum includes both didactic and experiential activities, and is highly structured. Because of this structure, facilitators must complete program training, but do not need specialized degrees to administer the intervention. Each of the three program components (parent, child, family) include detailed manuals, and the training for the group leaders (two-day long workshops) includes highly specific activities, roles, and direction for attendees.

The curriculum is taught by four group leaders over fourteen 2-hr group sessions. The parenting sessions review appropriate developmental expectations and teach parents how to interact positively with children. The curriculum focuses on ways that parents can reinforce a child's positive behavior, improve family communication and organization, and implement effective and consistent discipline. The children's skills training includes content on communication skills; relationships with parents, peers, and teachers; methods for cultivating resilience; problem-solving skills; content on peer resistance; and skill development in emotional identification, anger management, and coping. Children's groups are organized by child age, with children 3 to 5 years of age attending a separate (but simultaneously held) group from those 6 to 11 years of age. Day care is provided for children younger than 3 years of age. Family practice sessions provide parents and children with the opportunity to practice their skills through experiential exercises. Group leaders coach and encourage family members during parent/child interactions that occur during these sessions. Each of the 14 sessions is preceded by a meal that includes informal family practice time and family coaching.

Home practice assignments are designed to improve generalization of new behaviors outside of the group setting. The present implementation of SFP was unique in that participant children were in out-of-home care for the duration of the intervention, and may not have been physically available for home practice activities. To address this aspect of the curriculum, the group leaders helped the families to identify ways in which the parents could contact the children during the week for their assignment, and set a time or times for the interaction to occur by phone. Foster parents and child welfare workers each played a role in helping to ensure that children and biological parents were able to complete this task. When contact was not possible, parents and children were given separate assignments that addressed the skills they learned in the previous session. They began practicing this activity immediately upon arriving at the following week's session with the start of the family meal.

In this implementation of SFP, families at six sites received reunification centered child welfare services as usual, with the addition of SFP. The program was administered by four privatized family reunification providers divided by geographic service regions across the State of Kansas. Overall, the administration of the program remained remarkably similar across the sites, and the program population served and fidelity assessments and ratings provided through

the program developer were fairly constant, with gradual improvement in program fidelity at all sites as they became more experienced (Lutra Group, 2012).

2.2. Previous evaluations

SFP was initially evaluated in randomized control trials sponsored by the National Institute of Drug Abuse from 1982 to 1986 (Alvarado & Kumpfer, 2000; Kumpfer & Alvarado, 2003; Kumpfer, Alvarado, & Whiteside, 2003). More recently, SFP was identified in a Cochrane Collaboration Systemic Review as an effective intervention for the primary treatment of alcohol misuse among youth aged up to 25 years (Foxcroft, Ireland, Lister-Sharp, Lowe, & Breen, 2003). Though findings from the Cochrane Review suggest that SFP needs to be evaluated on a larger scale and in different settings to confirm prior results, these findings partly explain SFPs prominence in listings such as SAMHSA's National Registry of Evidence-based Programs and Practices (U.S. Department of Health and Human Services [USDHHS], SAMHSA, 2007).

Substantial benefits of SFP have also been estimated in cost analyses that have examined the reduction of future alcohol-use disorders among youth. Conservative estimates for the 7-week Iowa Strengthening Families Program (ISFP), which was implemented in a sample of sixth graders, generated a cost-effectiveness figure of \$12,459 per case prevented, a benefit-cost ratio of \$9.60 per \$1 invested, and net benefit of \$5923 per family (Spoth, Gyll, & Day, 2002).

SFP curriculums for families with children ages 3 to 5 years and 6 to 11 years were first tested in this Midwestern implementation with a substance affected child welfare population for whom reunification was the goal (Brook et al., 2012). In all of the site implementations, programs were targeted to the skill development of parents with a child in placement for whom substance abuse was determined to be of concern for at least one parent. Parent participants were not required to be in recovery from substance abuse, however, they were not allowed to attend group sessions while under the influence of alcohol or other drugs. In the first evaluation, SFP participants ($n=214$) and non-participants ($n=423$) were matched using propensity score analysis and tracked from February 2008 through September 2010. Survival analysis was used to study (1) the time from removal to reunification for cases that were reunified and (2) the time from entry into SFP to reunification for cases that were reunified. While reunification rates for the two groups were quite low in the first year, the groups diverged with the SFP treatment group moving significantly faster toward reunification. At the 360 day point from start of SFP, almost half (45%) of the SFP child participants had been reunified, compared to 27% of the comparison children. By 810 days, 82% of SFP children had been reunified, compared to 43% of comparison children (Brook et al., 2012).

According to the previous federal reporting data uploads for this Midwestern implementation, both SFP treatment and comparison groups had low rates of re-entry into care over time. The proportion of children returning to care (as of June 2011) was not significantly different between the two groups (2.23% among SFP participants and 2.99% among non-participants).

Here we demonstrate the costs and benefits of the provision of SFP on family reunification among substance-involved families in the child welfare system.

3. Methodology

3.1. SFP recruitment and sample characteristics

Child welfare workers were instructed to offer the program to families with children of 3 to 11 years of age with a case plan goal of reunification, for whom substance abuse was a concern for at least one parent. One child per family was eligible for study inclusion.

Families volunteered to participate, and were required to attend a minimum of 12 of the 14 sessions. Parents were not required to be in formal recovery for substance abuse; however, they could not be under the influence of alcohol or other drugs while participating in SFP.

Table 1 presents the demographic characteristics and disability status of participant children included in this analysis ($n = 262$). Gender was evenly distributed between males and females. The age of child participants ranged from 2 years to 15 years, with a mean of 8 years. When children were outside of the targeted age range, group leaders made a determination of developmental appropriateness for the children's group given the age and developmental level of other child participants. Alternative care arrangements were made for younger children and for older youth when necessary.

Seventy percent (70.2%) of children were of non-Hispanic white race/ethnicity, followed by African American (17.2%), Hispanic (8.4%) and other (4.2%). Nearly one-quarter (22.2%) of children had some type of emotional disturbance, and 5% of children had a medical condition that required some form of specialized care.

3.2. Child welfare data source

Data for the current analysis were drawn from information submitted by SFP for federal reporting purposes. The sample included the 262 SFP participants and 519 matched non-participants who were tracked from February 2008 through March 2011. The comparison group consisted of families with children in foster care (a) with removal reasons that included parental substance abuse, (b) with reunification as a case plan goal, and (c) who were not referred to SFP. Families were excluded from the comparison group if children were discharged due to emancipation or reunified prior to September 31, 2007 (as the formal starting date for the demonstration project was October 1, 2007). Only children who were removed later than January 1, 2002, were younger than 15 at removal, and were younger than 18.5 on March 31, 2011, were included for matching to maintain consistency with SFP participant children. The application of these criteria generated a pool of 11,828 children available for matching.¹ Stata IC version 11.0 was used for propensity score nearest neighbor one to two matching within a caliper (Guo & Fraser, 2009). The details of this matching process have been previously described (Brook et al., 2012).

3.3. Costs of SFP

The average program cost of SFP per child was generated for a typical 14-week program that serves a class of 10 children and their families (Table 2). Program costs were estimated using a budget provided by the developer (Lutra Group, n.d). The developer of SFP has been conducting implementations of SFP worldwide for approximately 30 years, and has maintained information on costs across sites through program implementation experience. The figures represented in the budget in Table 2 represent the most recently available figures, and are the developer's suggested figures for site use in requests for external funding and for use in internal budgeting as an implementation or sustainability consideration. The perspective from which costs were assessed was that of a payer, such as a state child welfare agency.

Program costs include staff (four group leaders and one site coordinator), meals (estimated at \$10 per family per week), child care (requiring two child care staff for three hours for each of the 14 sessions), program supplies (such as toys and paper products), completion incentives (\$50

Table 1
Demographic characteristics and disability status of child participants ($n = 262$).

Demographic characteristics	N	Percent
Gender		
Male	129	49.2
Female	133	50.8
Age when entering into SFP program		
2 to 3	25	9.5
4 to 6	66	25.2
7 to 12	165	63.0
13 to 15	6	2.3
Race/ethnicity		
White, non-Hispanic	184	70.2
African American, non-Hispanic	45	17.2
Hispanic	22	8.4
Other	11	4.2
Disability status		
No disability	182	69.7
Emotionally disturbed	58	22.2
Visually or hearing impaired	2	0.8
Other medically diagnosed condition requiring special care	14	5.4
Mental retardation	4	1.5
Physically disabled (child)	1	0.4

per family), and costs for handbook and manual duplication. Additional costs include staff training, fidelity monitoring, evaluation of change measures, reporting contributions, and monthly support, which were provided by Lutra Group at a cost of \$2820 per group.

Staffing is central to the implementation of SFP and comprises one of the largest cost items. The research in this work provides different staffing scenarios for the reader to consider. Given that costs for SFP can be adjusted depending on whether the program is staffed by members that are internal or external to the agency, per child costs in Table 2 are presented for each of three possible staffing arrangements. In scenario (a), the site coordinator and the group leaders are hired by the agency to staff the program. In column (b), agency staff provides site coordination for the program as part of their regular employment, and group leaders are hired externally. In scenario (c), agency staff provides both site coordination and group leadership as part of their regular employment.

In each of the staffing models, internal and external staff members are trained by Lutra Group and the fees for training related activities are included in the Lutra Group budget line. This budget line item was calculated by the developer and is provided to sites for use in implementation considerations. It should be noted that the trainings for SFP include group leaders and site coordinators, and these trainings allow for inclusion of up to 35 individual trainees at one time (for a fixed price), so that multiple staff configurations can be trained and prepared to deliver the intervention. In this implementation, some agencies trained both internal and external personnel to ensure adequate preparedness to deliver the service, and the sites (agencies) received payment to run the group from the grant monies, so these individuals (coordinator and group leaders) were assigned this work as a duty that was absorbed into their existing full time jobs. So, presumably they were relieved of some duties and picked up others, with the net expense of the agency staying the same (thus, in scenario "c" in Table 2, the values assigned to these individuals for costs were zero). For purposes of reporting our findings from this cost analysis, we use the most expensive model of service delivery (scenario a) for our cost analyses.

3.4. Out-of-home care costs

Costs for child welfare services were derived from the State's legislative division of post audit (State of Kansas, 2011). In this state, out-of-home related services have been provided by non-governmental not-for-profit agencies since 1997 when child welfare services were privatized. Currently the State office of Social and Rehabilitative Services

¹ It should be noted that the previously published study of these findings tracked participants through September 2010 (Brook et al., 2012). The research in this study extended the end date of participant tracking to March 2011, which allowed for a longer follow-up period.

Table 2
SFP program costs: group cost (per 10 children) and average cost per child by staffing model.

SFP program costs	Description	Staffing model		
		(a) External staffing	(b) Site coordinator internal	(c) Site coordinator and group leaders internal
Group leaders	4 × 14 weeks × \$20/hr × 5 hrs/week	\$5600	\$5600	\$0
Site coordinator	14 weeks × \$30/hr × 10 hrs/week	\$4200	\$0	\$0
Food	14 sessions × 10 children × \$10/children	\$1400	\$1400	\$1,400
Child care	14 weeks × 2 staff × \$15/hr × 3 hrs	\$1260	\$1260	\$1,260
Supplies	(paper products, toys)	\$440	\$440	\$440
Parent completion incentives	\$50 × 10 children	\$500	\$500	\$500
Handbook duplication	15 parents + 20 children × \$8	\$280	\$280	\$280
Manual duplication	4 trainers × \$30/set – one time	\$120	\$120	\$120
Lutra group	Training, fidelity monitoring, etc.	\$2820	\$2820	\$2,820
Total cost per group	10 children	\$16,620	\$12,420	\$6,820
Total cost per child	Total cost divided by 10 children	\$1662	\$1,242	\$682

(SRS) provides out-of-home services to children and families statewide through contracts with four service providers. Under the terms of these contracts, the service providers receive (a) a base payment each month to cover fixed overhead, administrative, and case management costs and (b) a monthly per-child rate for each child in out-of-home placement. According to the legislative division of post audit, these contracts represent 65% of the state and federal costs associated with out-of-home care. SRS staffing costs comprise another 2%, and medical costs represent the remaining 33% of total out-of-home costs (State of Kansas, 2011).

Variation exists in the monthly base payment (\$608,841 to \$937,293 per month) and per-child rates (\$1459 to \$1608) among the contractors. Therefore, we estimated average, low, and high per child costs for each day a child is in out-of-home placement in the state (Table 3). The range of estimates is conservative in the sense that it does not include additional costs borne by the child welfare agency.

3.5. Measure: days saved

The Strengthening Families Program has been demonstrated to reduce time in out-of-home care by increasing the reunification rate for participating families compared to a matched comparison group of out-of-home care cases receiving treatment as usual. As reported in a prior article (Brook et al., 2012), the appropriate analysis for comparing the two groups is event history analysis (a.k.a, survival analysis) which accounts for censored cases (those remaining in out-of-home care at the end of the study that might still be reunified). Results from the event history analysis are shown in Fig. 1. Savings accrue to the SFP for every day that the treatment cases are not in out-of-home placement. These savings derive from the various sources discussed, including payments to out-of-home care providers and administrative costs associated with the management of open cases.

The first step in measuring these savings is to calculate the difference in days in out-of-home care for the two groups. The current research considered several options for making this calculation before deciding on what we believe is the best and most accurate method. One option would be to use some measure of central tendency.

Table 3
Out-of-home, SRS, and medical costs associated with out-of-home care for FY 2011.

Cost item	% of Total cost	Average daily cost per child	Low daily cost per child	High daily cost per child
Out of home services contracts	65%	\$55.71	\$51.90	\$58.96
SRS staff costs	2%	\$1.71	\$1.60	\$1.81
Medical costs	33%	\$28.28	\$26.35	\$29.93
Total	100%	\$85.70	\$79.85	\$90.70

Average or mean time in placement can be calculated for both groups but is undesirable because it fails to account for censored cases. In conducting event history analysis, the time in placement variable is calculated as the time from removal to the date of last observation. Average days for this variable were 337 and 369 for the treatment and comparison groups, respectively. Thus the average days saved using this measure is 32 days.

Median time in placement can generally be calculated from event history analysis; however, it can be undefined or ambiguous when 50% or more of the cases do not achieve the defined event. This is the case here for the comparison group as shown in Fig. 1. The median has an additional disadvantage that is made evident when one considers the survival chart (Fig. 1). The median represents a single point on the survival curve; the point at which 50% of the cases have been reunified. This value is 714 for the SFP group and 1108 for the comparison group or 394 days saved for a “typical” case.

A more complete and accurate description of the reunification “profile” for each group is obtained by comparing the entire survival line for each group. The total days saved from this perspective is equal to the area between the two curves (see Fig. 1). Consideration of the survival curves also provides the opportunity to consider differences for specific intervals such as in the first 6, 12, or 24 months or between months 6 and 12. This can be particularly advantageous when tied to specific policy decisions (e.g., budget periods) or, in this instance, where differences in survival curves are not evident for specific time periods. Here one can see that treatment effects do not emerge until considerable time in placement has elapsed (around 18 months). Under other scenarios, differences (treatment effects)

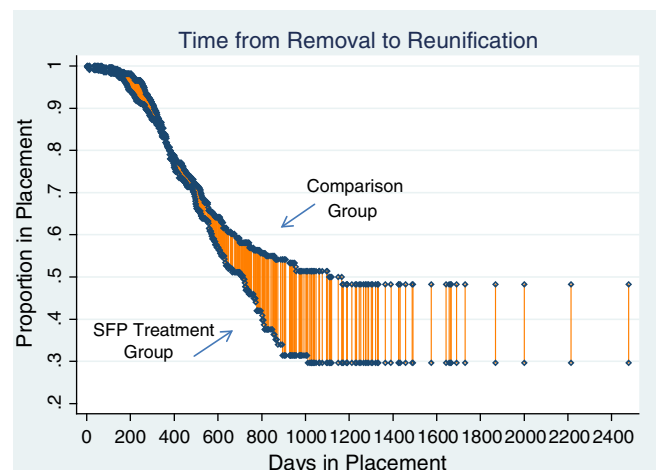


Fig. 1. Survival graph for SFP and comparison groups.

$$Y_i = \beta_{1i} * X_i + \beta_{2i} * X_i^2 + \beta_{3i} * X_i^3 + \alpha_i$$

Y_i = Proportion of children who were still in foster care in group i ($i = 1$, SFP treatment group; $i = 2$, matched comparison group)

X_i = The time of observation (days) in group i

β_{ij} = coefficient of X^j in group i ($j = 1, 2, 3$)

α_i = intercept in group i

Model fit:

Comparison group: F (3, 395) = 5359.92, $p < .001$, Adjust R-squared = 0.9758

$$Y_1 = -9.695E-04 * x_1 + 4.460E-07 * x_1^2 - 5.810E-11 * x_1^3 + 1.097$$

SFP treatment group: F (3, 224) = 4422.38, $p < .001$, Adjusted R-squared = 0.9832

$$Y_2 = -1.009E-03 * x_2 - 1.340E-07 * x_2^2 + 2.630E-10 * x_2^3 + 1.184$$

Fig. 2. Cubic equation.

might emerge early and then both groups might ultimately achieve the same end result (lines rejoin).

Graphically this measure of time can be thought of as the shaded area between the two curves over any time interval as specified on the horizontal axis of Fig. 1. To calculate this measure we performed the following steps:

1. Produce the life table for each curve using a one-day interval.
2. For each curve, run a curvilinear regression analysis regressing the cumulative survival rate on the day associated with each rate. In other words, we fit an equation to the lines shown in Fig. 1. We tested a cubic equation for each group and the cubic term was significant for the comparison group and was then retained for both equations.
3. Use the resulting equations to calculate the integral of the difference between the two equations yielding the total days saved for the profiled comparison of the two groups. The resulting equations and calculations are shown in Figs. 2 and 3. The equation at the top of Fig. 2 is the equation for the cubic regression of the cumulative survival rate on days of placement. These data come directly from the life tables that generated the survival curves in Fig. 1. The results at the bottom of Fig. 2 show the resulting regression equations for each group with the estimated regression coefficients. The integral of each of these equations provides the area under each survival curve and the integral of the difference in the two equations provides the area between the two curves (i.e. the shaded area in Fig. 1). These calculations yield a “typical” savings of 190 days. This is the figure we have used in calculating dollar savings attributable to participation in the SFP.

4. Findings

On average, the typical SFP child participant spends 190 fewer days in out-of-home care than their non-SFP counterparts. At an average out-of-home care rate of \$86 per child per day, SFP saves approximately \$16,340 per child in state and federal out-of-home care costs.

To determine the cost effectiveness of SFP, we divided the average costs of SFP per child (\$1662) by the 190 days saved for the typical child. This calculation generates a SFP cost of \$8.75 per child for every day that a child is not in out-of-home care. Compared to the average cost of \$85.70 per day, this reflects a ten-fold savings. Table 4 demonstrates how savings in the State of Kansas may accrue depending on the program staffing model and regional variation in out-of-home costs.

Stated from a cost–benefit perspective, every \$1 invested in SFP yields an average savings of \$9.83 in this demonstration. As Table 4 depicts, savings can range from a low of \$9.15 for every \$1 invested to a high of \$25.35 for every \$1 invested depending on the level of out-of-home care cost and the SFP staffing model. We would expect these savings to be even greater if legal costs and court costs were included in the models.

5. Discussion

Over the past decade, cost analysis has been recognized as a key component of child welfare intervention research because it answers a fundamental question: “is the program ‘worth it’ in a financial sense?” (p. 116, Foster et al., 2003; Goldhaber-Fiebert et al., 2011). This study contributes to the small but growing number of cost analyses that seek to demonstrate returns on program investments in

$$\begin{aligned} \text{Total difference (survival)} &= \int_0^{1730} [(-9.695E-04 * x + 4.460E-07 * x^2 - 5.810E-11 * x^3 + \\ &1.097) - (-1.009E-03 * x - 1.340E-07 * x^2 + 2.630E-10 * x^3 + 1.184)] dx = \int_0^{1730} (3.900E-05 * \\ &x + 5.800E-07 * x^2 - 3.211E-10 * x^3 - 8.691E-02) dx = (-8.028E-11 * x^4 + 1.9333E-07 * x^3 + \\ &1.950E-05 * x^2 - 8.691E-02 * x + c) \Big|_0^{1730} = 189.977 \end{aligned}$$

Fig. 3. Integral calculation of days saved.

Table 4
Cost benefit of SFP per \$1 investment, by out-of-home cost and staffing model.

Out-of-home cost	SFP staffing model		
	(a) External staffing	(b) Site coordinator internal	(c) Site coordinator and group leaders internal
Low	\$9.15	\$12.24	\$22.29
Average	\$9.83	\$13.16	\$23.96
High	\$10.40	\$13.92	\$25.35

child welfare by calculating the costs and benefits of a novel application of the Strengthening Families Program to substance affected families involved with child welfare services. Some of the limitations of our analysis relate to the availability of cost data, limited opportunity to examine variation in the impact of the intervention and related costs, and the inability to make comparisons of findings across similar interventions. These limitations are discussed in turn.

5.1. Cost data limitations

The steps involved in measuring the direct costs of an intervention included identifying both the explicit and implicit resources involved, measuring their use, and valuing the resources used in dollar terms (Gold, Siegel, Russell, & Weinstein, 1996). Explicit costs typically include variable costs such as personnel, supplies, travel, and incentives, as well as fixed costs such as space, utilities, administration, equipment, and training (Foster et al., 2003). While we were able to obtain firm data from the developer for many of the explicit costs, we were unable to consider the administrative costs of SFP beyond program staffing. At most sites, meetings were held at churches in order to prepare warm meals, thereby offsetting the costs associated with space and utilities. Though statewide implementation was by and large consistent across sites, some supply costs varied depending on local donations, and we were unable to capture this variation. For example, at some sites the food for meals was donated. At other sites, a major chain retailer donated supplies such as crayons for the children's groups. Given that the cost of delivering any intervention will vary from site to site and possibly within a site as conditions change, the purpose of the budget in Table 2 is to provide a baseline, or starting point for readers to use as a reference when considering SFP. However, future cost analyses will benefit from planning data collection strategies that incorporate site specific data collection strategies for the full range of explicit costs mentioned, as well as implicit intervention costs (i.e., those resources for which no explicit payments are made). Such implicit costs might include parental time (that might otherwise be used for activities such as employment) and time contributed by volunteers. Researchers might consider having parents and program administrators complete a short questionnaire regarding relevant items at designated intervention sessions to capture these data.

Due to various constraints, this study was unable to report on the indirect costs of SFP on other programs. Children and parents involved with the child welfare system are frequently involved in many child- and adult-serving sectors (e.g., court systems, mental health, etc.), and the costs of these services can be substantial. Such costs might have been reduced by SFP, representing areas of so-called cost offset (Foster et al., 2003). Conversely, SFP may have increased the use of additional services in child- and adult-serving sectors by linking families to needed services, thereby increasing related expenditures. Future studies should seek to incorporate these indirect costs where possible to determine the full range of costs and benefits that programs generate within broader systems of care.

5.2. Estimating variation in program impact

In this study, a range of cost estimates was generated to reflect reported variation in state child welfare costs. However, future

evaluations might examine variation in the impact of interventions across subgroups of children and families based on relevant factors such as level of functioning or child placement type. For example, in an elegant cost analysis of a randomized control trial of depression treatment among adolescents, Lynch et al. (2011) found combined treatment to have a higher net benefit for subgroups of youth without a history of abuse, with lower levels of hopelessness, and with comorbid conditions. Similarly, differential effects for subgroups, and the costs associated with those effects, could be determined by examining the moderating effects of relevant variables in statistical models.

5.3. Limits to cost comparisons

As Chamberlain and her colleagues have noted (2011), the questions surrounding the decision to implement a new intervention or plan for the sustainability of a promising one are not limited to whether the intervention achieves the desired outcomes. Decision makers benefit from having data regarding the costs and benefits of an intervention to compare with the costs of maintaining the status quo and the costs and benefits of similar interventions (Chamberlain et al., 2011). SFP is best viewed as an enhancement to standard child welfare services and protocol. Therefore, the cost of maintaining the status quo is reflected in costs associated with child days in out-of-home placement in the absence of SFP. However, cost–benefit comparisons of SFP to similar interventions were beyond the scope of this article, largely because such costs are not available through published or unpublished literature. For example, the costs associated with substance abuse treatment might form a basis for comparison to the costs of SFP. However, the capture of comparable treatment data and related cost information has historically been problematic (Young, Gardner, & Dennis, 1998). Meaningful comparisons of SFP to promising parenting programs are difficult to make given few published cost analyses (Goldhaber-Fiebert et al., 2011) and important differences between programs in purpose, theoretical approach, service components, outcomes measured, and populations served (Barth, 2009). Such differences are worthy of careful consideration from both a programmatic standpoint and a cost perspective. For example, given the inclusion of children in the intervention, SFP is more appropriately described as family skills training (rather than parenting training), and this is an important distinction. The inclusion of children adds to the cost of the program and to the complexity of service delivery within out-of-home care settings; yet, our observations and prior research indicate that the presence of children contributes to the success of the program (Biglan & Taylor, 2000; Kumpfer & Alvarado, 1998, 2003; Taylor & Biglan, 1998).

5.4. Implications for practice

From the perspective of child welfare, findings from this study suggest that SFP is a promising and cost effective approach to reducing time to reunification among voluntary, substance affected parent participants with children in out-of-home placement. Importantly, reunified child participants were no more likely to reenter out-of-home placement at follow-up than comparison children. From the perspective of the substance abuse field, more work remains to determine the components of an effective comprehensive/integrated service delivery system; however, SFP represents a promising, cost-effective contribution.

It is noteworthy that the cost analyses presented here required technical expertise that is typically beyond what is available to program administrators. As the search for effective intervention strategies continues, a critical piece of this analysis concerns the need for comprehensive, uniform methods by which researchers and program administrators can estimate the costs and benefits of their programs. The adaptation of the English Cost Calculator in the U.S. represents an important advance in standardizing child welfare cost analysis process and outcome (Chamberlain et al., 2011). Going forward, attention

must also be given to ways in which the field can build capacity for conducting cost analyses.

One of the major challenges that Johnson and Austin (2006) identified with regards to the implementation of evidence-based practices in organizational settings was the need to build organizational cultures that support such practices. This challenge extends to the implementation of cost analysis in the context of evidence-based practice in that it requires similar resources of agency motivation, time, and expertise. Universities are uniquely positioned to partner with child welfare agencies to provide expertise in cost analysis in the context of demonstrations, and to provide training, within child welfare agencies and on university campuses, to build capacity for agencies to conduct their own cost analyses. To sustain empirically supported practices, the importance of such capacity building cannot be understated.

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