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Is implementation fidelity associated with improved access to care in a School-based Child and Family Team model?

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ABSTRACT

Effective child and family centered service planning is crucial to addressing vulnerable children's needs. However, there is limited evidence about what facets of these processes improve service use and outcomes. The current study used a Poisson random effects hazard model to test correlations between fidelity to NC's Child and Family Support Team model and time to service receipt, using case management data for 3396 children served by that program during the 2008–2009 school year. Students were more likely to receive recommended services more quickly when caregivers and the students attended planning meetings, when their plans included services for caregivers, and when child and family team leaders followed up after meetings to verify service receipt. Contrary to the Child and Family Support Team theory of change, match between student needs and the lead agency of the meeting was not associated with the odds of quicker service receipt, nor was attendance by natural supports. Findings from this study demonstrate the potential effectiveness of using case management systems to measure service planning process fidelity, as well as how results thereof can both inform process improvement and potential refinements to models' theories of change.

1. Introduction

In the United States, public schools are tasked with providing all students a free and appropriate education. A range of factors, often co-occurring, can undermine academic achievement, including poverty and unmet physical and mental health needs (Greenberg et al., 2003). For schools, finding and implementing cost effective strategies to address these needs is challenging, and potentially entails marshaling community health and human services as well as school-based services. Although many studies of school-based programs focus on the programs' effectiveness at altering specific outcomes, little research has been devoted to developing fidelity measures that explain the quality of program implementation (Domitrovich & Greenberg, 2000). Programs, when implemented at large scale, are notorious for not achieving their intended impact (Fixsen, Naoom, Blase, & Friedman, 2005). This study aims to inform program evaluation by examining specific aspects of program implementation that predict positive outcomes for service delivery.

Several widely used mechanisms to coordinate services for children and families include child and family teams used in child welfare, Multisystemic Therapy (Henggeler, 1999), Systems of Care for mental health (Stroul & Blau, 2010), and Wraparound services (Bruns & Walker, 2010). Common principles of these programs include the family's central role in planning and decision-making and a focus on coordinating services from multiple agencies. Several studies have examined the connection between the Wraparound process and students' academic outcomes. While not all studies have found that these models have improved academic outcomes (e.g. Strompolis et al., 2012), some have found positive results. For example, 70 youth with serious emotional disturbances who received intensive Wraparound services showed improvements in behavior and academic outcomes six months later (Eber, Hyde, & Suter, 2010). Similarly, a meta-analysis found that Wraparound was generally associated with improved student functioning in school (Suter & Bruns, 2009).

For these programs to reliably improve youth outcomes, a solid understanding of which program components drive results is

Abbreviations: CFST, Child and Family Support Team.

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needed (Dane & Schneider, 1998). Building this evidence base depends on measuring fidelity to the program's model, ideally in ways that are feasible to replicate across settings. Only a few studies have focused on developing fidelity measures based on the underlying program principles (Bruns, Suter, Force, & Burchard, 2005; Cox, Baker, & Wong, 2010; Henggeler, Melton, Brondino, Scherer, & Hanley, 1997).

The current study examines the North Carolina School-based Child and Family Support Teams (CFST) initiative (Gifford et al., 2010), which shares key principles with models such as Wraparound and Multisystemic Therapy. The CFST program aims to help students with unmet needs that are preventing them from exceling in school, including unstable family situations, by connecting them to supports and services. CFST's underlying theory of change is that the coordinated effort of providers who are focused on the family's needs and strengths will facilitate access to appropriate services. This paper operationalizes program principles into fidelity measures and assesses their importance for achieving one intermediate outcome—timely receipt of services. This measure is commonly used in health services research to assess quality of care coordination and access to services (e.g. (Gulliford et al., 2002; Strickland et al., 2004; Wang, Berglund, & Olfson, 2005). Delays and potentially foregone service receipt can have detrimental effects on children and their caregivers (Fairbrother, Stuber, Galea, Pfefferbaum, & Fleischman, 2004; Kilmer & Gil-Rivas, 2010; Lave, 1998). For example, delays in treating health or mental health conditions may lead to the need for more costly services (Hadley, 2003; Savage, Lee, Kotch, & Vann 2004). Children suffering with untreated conditions may be less able to attend to their schoolwork (Fröjd et al., 2008; Jyoti, Frongillo, & Jones, 2005; Williams, 2005). A school year is relatively short—typically 180 days of class time (Patall, Cooper, & Allen, 2010). Students' progress in one year carries forward to their placement in classes and even whether or not they are promoted to the next grade (Glied & Pine, 2002). Therefore, delaying access to services could negatively affect both their immediate and longer-term academic attainment (Glied & Pine, 2002).

1.1. The North Carolina Child and Family Support Teams initiative

The CFST initiative was first implemented during the 2006–2007 school year as a means of addressing the multiple factors that could impede youths' school performance or lead to out-of-home placement. The program initially placed 100 nurse–social worker pairs into elementary, middle, and high schools in 21 high needs school districts. Nurses and social workers were charged with identifying students who are at-risk for academic failure or out-of-home placement. Referrals to the program may come from any source, including school staff, family members, and outside agencies. Nurses and social workers also coordinate child and family team meetings. Similar to child and family teams used in child welfare, Systems of Care, and Wraparound (Walker & Matarese, 2011), the CFST program's underlying theory of change involves a team jointly assessing the child's and family's strengths and needs. Key provisions of the authorizing legislation included tailoring plans to children's specific individual needs, incorporating all relevant providers in a single team with a common plan, involving families in decision-making, and ongoing monitoring of service plan outcomes ("Appropriations Act," 2005).

CFST serves a wide range of developmental ages (elementary through high school) and children's needs (anything that place a child at risk for academic failure or out-of-home placement). The program is designed to be collaborative with community partners in many communities. Therefore, the assessment process is intentionally not specified by the CFST program. Professionals and other supports at the team meeting can exercise discretion regarding which tools to use for assessing the students' and families' needs.

Operationally, CFST involves the following steps. First, CFST nurses and social workers identify students who are at-risk for academic failure due to an unmet need. The CFST staff then facilitates a team meeting that includes key supports for the child and his or her family. The supports should include the student (if developmentally appropriate), the student's caregiver as well as professional (e.g., service providers, school staff members) and natural supports (e.g., friends, neighbors, coaches) that may be involved in helping the student meet his or her goals. The team then jointly discusses the student's needs and agrees on the student's primary unmet need and develops a plan for helping the student meet his/her goals. For instance, if the team identifies the child's greatest unmet need as mental health-related, they may then plan a referral to a local mental health provider. The plan may include a single service or multiple services depending on the student's needs.

1.2. The relationship between fidelity and program effectiveness

Fidelity is defined as the degree to which the program operates as intended by the program creators (Dusenbury, Brannigan, Falco, & Hansen, 2003). When programs are not implemented with fidelity, null findings do not distinguish between a poorly designed program and a poorly implemented program (Dobson & Cook, 1980). Studying specific program elements requires operationalizing and measuring program principles and linking the measures to program outcomes. Improved measurement could support dissemination and take-up of evidenced-based programs and assurance of consistently positive results (Elias, Zins, Graczyk, & Weissberg, 2003).

Fixsen, Blase, Naoom, and Wallace (2009) note that infusing science into improved performance in human services is unusually challenging because the "*intervention is the practitioner* (p. 2)." Therefore fidelity measurement needs to reflect those practitioners' daily performance. Ideally, such measures are both effective and efficient (Schoenwald et al., 2011). Effective measures have a clear purpose, focus on essential aspects of the intervention, align the timing and frequency of data collection with measurement needs, and have a scoring scheme that maps onto specific purposes. Efficient measures have utility for multiple end users (e.g. supervisors, case workers, researchers) and for multiple purposes (e.g. training, quality assurance). Such shared use of common metrics is premised on end users understanding and accepting the fidelity definitions.

There have been several attempts to develop fidelity measures for family and group decision-making programs that have principles similar to CFST. For the Wraparound process, the Wraparound Fidelity Index was developed to capture adherence to the 11 core program principles (family voice and choice, team-driven, individualized, natural supports, community-based, culturally competent, strengths-based, unconditional care, collaboration, flexible resources, outcomes) (Bruns, Burchard, Suter, Leverentz-Brady, & Force, 2004; Bruns et al., 2005). Data for this measure were collected through structured interviews with multiple informants including the caregiver, the youth, and the care coordinator. Higher caregiver ratings of fidelity were positively associated with caregivers' satisfaction with their children's progress six month after services (Bruns et al., 2005). Higher care coordinator ratings of fidelity were associated with improved behavioral and emotional ratings.

Another measure used to assess fidelity of the Wraparound process is the Wraparound Observation Form (WOF). The revised, second version—the WOF-2—is a 48 item form designed to assess eight characteristics of the Wraparound process (Epstein et al.,

2003; Nordness & Epstein, 2003). Information from the observation form can be used to confirm that care coordinators are generally implementing the wraparound approach as intended (see Epstein et al., 2003; Nordness, 2005). The WOF-2 has also provided formative information to program developers and implementers; Counter to the prescribed wraparound approach, informal supports infrequently attended meetings and meeting discussions failed to incorporate criteria for ending the families' participation in wraparound (see Epstein et al., 2003). The WOF-2 has also been used to compare implementation fidelity in school-based relative to community-based settings (Nordness, 2005). Results indicated that a higher percentage of school-based than community-based wraparound programs adhered to the principles of *Interagency Collaboration* and *Care Coordination.* Such insights could then be used to inform program developers and implementers into the underlying reasons for relatively low inclusion of informal supports or reasons for the relative advantage of the school system in implementing some characteristics of the model.

Research on Multisystemic Therapy (MST) has also demonstrated how fidelity can predict variation in program effectiveness. MST is a program designed to treat violent and chronic juvenile offenders and their families. Initial studies found that the program improved adolescent psychological symptomology and decreased incarceration rates (Henggeler et al., 1997; Henggeler, Melton, & Smith, 1992; Henggeler, Pickrel, & Brondino, 1999; Henggeler et al., 1986). When the program appeared less effective for youth who were subsequently served, researchers investigated possible reasons and found that adherence to model fidelity moderated program effectiveness (Henggeler et al., 1997). For example, worse adolescent psychological symptomatology was associated with parent reports of worse adherence to the following fidelity measures: therapist emphasis on family interactions, having clear direction in therapy, and family-therapist consensus (Henggeler et al., 1997). Likewise, higher rates of adolescent delinquency were observed when the therapist reported poorer adherence to fidelity measures. Similar associations were observed in another study of the link between fidelity measures and family functioning (Schoenwald, Henggeler, Brondino, & Rowland, 2000).

Although the studies listed above are exemplary for their inclusion of effective fidelity measures—which are often lacking in outcome studies—they also suffer from limitations in their methods and their practicality. According to Schoenwald's (2011) definition, the fidelity measures were perhaps inefficient. For example, the Wraparound Fidelity Index (version 2) average completion time per team was 20 min for each of three reporters—the staff coordinator, caregiver, and the youth (Bruns et al., 2004). Additional time was necessary for arranging interviews and entering the data, further increasing the cost of employing this tool. The WOF-2 required trained observers who were not meeting participants to attend the meeting. Because the WOF-2 was used as part of a research study, only meetings that had family permission prior to the meeting could be included in the study. It is possible that the sample of observed meetings does not reflect the average meeting as those implementing the wraparound process may steer the meeting observers to meetings that they expect will best reflect the implementation of the principles.

The Multisystemic Therapy fidelity measures have similar limitations. Through expert consensus a 26-item Likert-style questionnaire was developed to measure family and therapist behaviors specific to the program (Henggeler et al., 1997). Parents, adolescents, and therapists completed the surveys after randomly selected therapy sessions. For an agency that is not currently working with a trained evaluator, the use of these measures may be challenging. Also, because of the time required to process these measures, it may be difficult for the information to be used for multiple purposes—such as to demonstrate change over time for a given provider relative to a quality improvement goal. As with the Wraparound Fidelity Index tool because of the time required for multiple informants to complete the task, this tool is better suited for a sample of teams rather than the full population being served. This raises the risk of drawing invalid conclusions from a non-random sample. Further, as in many areas of social science, interviews and surveys are subject to bias from item ambiguity, social desirability, transient mood states, and leniency (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

1.3. Creating fidelity measures for the Child and Family Support Teams initiative

The current study uses data from the North Carolina School-based Child and Family Team initiative. Unlike the studies reviewed above in which the fidelity measures are based on family or therapist report of factors that reflect program adherence to program principles, the current study uses an administrative database specifically created for the CFST initiative where the nurses and social workers record information such as who has attended each meeting, the student's primary unmet need, the services recommended, and whether or not the services have been received. Because the role of the nurse–social worker team is to coordinate care and facilitate access, this study focuses on length of time from when the service was planned until the service is received. A crucial pre-condition to successful service use is timely entry (Beal et al., 2004). Conceptually, shorter time until receipt of recommended services indicates better access to care. This is particularly important for children because of their rapid development, and especially for those in crisis. Another advantage of this proximal outcome for measurement is that it is relevant to all participants in the CFST program—regardless of the child's age or type of service needed. Because the CFST program works with children of a wide range of ages (pre-K through high school) and a wide range of needs (academic, mental health, poverty-related) there are relatively few measures that are applicable to such diverse groups. In contrast, the effect of services on educational outcomes may be highly variable across students; for example, tutoring services may have a more immediate impact on math scores than substance abuse treatment services have on math scores.

1.4. Rationale for fidelity measures

Based on operational facets of the CFST program as outlined in the authorizing legislation, we examined several facets of fidelity:

Attendance of caregivers and students in CFST meetings: Ensuring that services are family and youth-driven is among System of Care's core values (Stroul & Blau, 2010; Stroul & Friedman, 1996). Including families in service-related planning meetings is considered fundamental to actualizing this goal (Friesen & Huff, 1990).

Attendance of natural supports in CFST meetings: Natural supports are people and other resources accessible to the family through their social and community relationships (Walker & Koroloff, 2007). Including natural supports in team meetings reflects two System of Care emphases: The first is a 'competence' or 'strengths-based' paradigm, wherein the role of professionals is to help families build their own support systems to actualize their intrinsic strengths over time (Marsh, 1996). The second is cultural competence, including working with each family's informal natural supports, as well as more formal local resources such as churches and other community organizations (Benjamin & Isaacs-Shockley, 1996).

Match between student's primary unmet need and agency leading CFST meeting: The System of Care philosophy emphasizes that services should be tailored to each child's individual needs and

community-based (Stroul & Friedman, 1996). In actuality, services have often been driven by the norms and routines of the agencies where children's needs are first identified. To overcome these inertial tendencies, management researchers have noted the need for interdisciplinary teams to defer to whichever member has expertise relevant to any given situation (Cross, Ehrlich, Dawson, & Helferich, 2008). In order to ensure that plans were adapted to each child's needs, CFST authorizing legislation therefore required that the agency representing child and family primary unmet need be the lead ("Appropriations Act," 2005) (see Table 1). For example, if the student's primary unmet need is related to mental health issues, then in accordance with the legislation, the lead agency would be the local mental health authority. The lead agency's roles in the CFST program include: scheduling team meetings; engaging the family; being the main contact for team members; and using team meetings to monitor the case for progress toward goals, satisfaction with services, changes in service need and transitioning the family to changes in service providers (Foster, Troop, & Gifford, 2013).

Support for caregiver: Philosophically, supporting caregivers is part of the System of Care emphasis on actualizing family competence. Child and family team plans may include multiple services—some geared toward the focal child and others aimed at supporting the family members. Previous research has found that gaps in caregiver resources can have negative consequences for children. Children of teenage mothers are at increased risk of repeating a grade, lower math and reading scores, and early school leaving (Jaffee, Caspi, Moffitt, Belsky, & Silva, 2001; Levine, Pollack, & Comfort, 2001; Menaghan, Kowaleski-Jones, & Mott, 1997). Maternal depression, substance use and other emotional or psychological ailments can also impede youth's ability to succeed in school, as can poverty. Addressing caregiver needs may help them better care for their children (Huston et al., 2011). Supports for caregivers with children with physical, emotional or behavioral ailments may enable them better cope with their child's needs (Lightfoot & LaLiberte, 2011).

Timely follow-up on recommended services: The guiding principles of Systems of Care include coordination ensuring that various services complement rather than compete with each other and are adapted over time to families' changing needs (Stroul & Blau, 2010). Following up provides an opportunity for caseworkers to help families overcome initial hurdles to accessing services as well as plan next steps.

2. Method

2.1. Data

Data for this analysis come from a Web-based case management system developed for the CFST program. The case management system allows nurses and school workers to track students who are referred to the CFST program in their school. In addition to the students' gender, race and ethnicity, nurses and social workers enter information about each team meeting including the time, date, location, attendees, and the student's primary unmet need. The nurses and social workers also enter the services that the team recommends for the student or family. Finally, follow-up information on each recommended service is collected, including the date of each time that the CFST leader followed up, whether or not the youth received the recommended service, and the date that the service was received.

This analysis was limited to services that were recommended on the date of the student's first team meeting during the 2008–2009 school year. Because two fidelity measures were related to the link between attendee type and primary unmet need, students whose primary unmet need was ambiguously related to a service provider were omitted from our analysis; this included 322 recommended service plans from 154 students. These students did not differ from the analytic sample on gender, school type, and race/ethnicity. The excluded primary unmet needs identified family custody and other legal factors, family member military involvement, frequent moves, parental incarceration, children's designation as "latch-key," caregiver or family member needs, and other social service factors.

The Duke University Institutional Review Board approved this study.

2.2. Measures

The outcome measure for this analysis was length of time between when the service was recommended and when the service was received. The nurses and social workers through follow-up meetings and phone calls with the families identified timing of service receipt. Service receipt was examined through the end of the 2008–2009 school year; 49% of recommended services were received in the study period; we treated the remaining 51% as

Table 1
Link between student's primary unmet need and agency representatives' professional role.

Student's primary unmet need	Agency representatives that match this unmet need	Lead Agency that matches this unmet need
Academic: *Failure*: English as a second language, scored lower than a 3 on the end of course or end of grade test, receipt of exceptional child's services, failed 2 or more subjects, retained one or more years, *Disengagement*: Excessive absences, excessive tardiness, leaves early, referred by the school assistance team or the CSI team, skips class, sudden drop in grades, suspensions, other academic	CFST Leader at Current School Principal or other School Administrator School-based Team School Counselor Teacher Other school staff	School
Health: Asthma, dental, diabetes, hearing, obesity/overweight, pregnant/parenting, vision, other health concerns	Representative from public health or other medical provider	Public Health
Delinquent and criminal activity: Delinquent and criminal activity, gang involvement	Representative from Department of Juvenile Justice and Delinquency Prevention	Department of Juvenile Justice and Delinquency Prevention
Mental health: Aggressive behavior, depression, development issues, inappropriate behavior, socially awkward, suspected substance use, victim of bullying, withdrawn change in behavior, other mental health, substance use or behavioral disorder	Local Mental Health Authority Other mental health provider	Local Mental Health Authority
Social services: History of abuse, neglect, dependency, domestic violence; homelessness, lack of food, low-income	Representative from Department of Social Services	Department of Social Services

right-censored (i.e., for which no service receipt was observed at the end of the observation period).

The six fidelity measures examined in this study described characteristics of the team meeting. The first two were binary variables indicating the attendance of at least one parent or primary caregiver and the student at the meeting. The third fidelity measure was a binary variable indicating whether at least one natural support attended a child and family team meeting. This variable reflected any of the following participants: the student's sibling, family member other than the primary caregiver, neighbor or family friend, religious leader, or friend or peer. The fourth measure indicated whether the lead agency matched the student's primary unmet need. To construct this measure, the research team grouped the student's primary unmet need into one of six categories: academic failure, academic disengagement, health, delinquency/crime, mental health, and social service. Each need category was mapped to the lead agency to determine if the child's primary unmet need matched the agency that led the team meeting (see Table 1). The fifth measure was a binary variable indicating that at least one of the recommended services was support for the child's caregiver. The sixth and final fidelity measure was an ordinal variable for the timing of receipt of follow-up by the CFST nurse or social worker: within 14 days, 15–30 days, 31–45 days, or more than 45 days (reference category).

Several covariates were used to control for otherwise potentially confounding effects on timeliness of service receipt. These included students' gender (female relative to male as the reference), race/ethnicity (Black-Non Hispanic, Hispanic, and other race/ethnicity with White-non Hispanic as the omitted category), and grade level (middle or junior high [6–9], high school [9–12] relative to elementary school [pre-K-5]).

Based on the expectation that school-based services would be more accessible to students than services from an outside provider, the service location was categorized as school-based, non-school-based medical provider, or non-school-based community provider (reference group). School-based services included behavioral contracts, extra-curricular activities, school-based tutoring, community college, referrals to alternative school, school-based counseling, and school-based mental health services. Medical services include referrals to a mental health provider, to substance abuse treatment, to a private medical provider, or to public health. Services that were neither school-based nor medical were coded as non school-based community provider and served as the reference group.

To account for the fact that receiving services during the holiday season might be more difficult because people were more likely to be on vacation at that time, the model included a variable that indicated whether the service plan occurred from November 15 to December 31. The model also controlled for the student's need that the service plan was designed to address. Needs were categorized as indicated in Table 1 and included dummy variables for academic failure (reference), academic disengagement, health, delinquency/crime, mental health, or social services. Families with multiple unmet needs may also face more hurdles in accessing services than families who are confronting a specific issue (Silver & Stein, 2001). For example, a family of child who is depressed but economically stable maybe better able to access services than a family who in addition to the child's depression is facing issues related to poverty. As a measure of this case complexity, the model included a count variable for the number of services that were recommended for the child at the team meeting.

2.3. Analysis

The data for this analysis have a three level hierarchical structure, with recommended services (r) nested within student (i), who were in turn nested within schools. This nesting results in a violation of the independence assumption of ordinary least squares. To accommodate this clustering, our model of time to service receipt included random error terms for each of these levels. We used a hazard model to measure the odds of receiving services over time. A Poisson distribution was used because this approach has been shown to produce similar results to the commonly used Cox proportional hazard (Whitehead, 1980) and has been extended to include random error terms that account for hierarchical data (Ma, Krewski, & Burnett, 2003). A benefit of hazard modeling is its ability to accommodate right censored observations. Analyses were conducted in Stata version 12 using the command xtmepoisson (StataCorp, 2011).

Although each student may have had multiple child and family team meetings, this analysis is limited to the student's first such meeting of the school year. There are both computational and substantive reasons for selecting the first meeting of the year. The primary reason for limiting the number of meetings included in the analysis is that it is computationally difficult to estimate more than three levels given currently available software. By choosing the first team meeting of the year, we have the longest possible window to observe service receipt prior to censoring at the end of the school-year. And conceptually, addressing students' unmet needs earlier in the school year should help them do better in school throughout the year.

The equation describes components of the model. A multivariate approach allowed us to isolate the effect of each fidelity measure by controlling for exogenous factors that may have been simultaneously related to both the dependent variable and a covariate of interest (Angrist & Pischke, 2009). (For example, if girls were both more likely to be present at team meetings than were boys and had lower odds of receiving services sooner, and then excluding gender from the would bias our results for student present at meeting.)

$$\ln(timetoservicereceipt)_{ris} = \gamma_1 student_{is} + \gamma_2 meeting_{is} + \gamma_3 service_{ris} + \gamma_4 time_{ris} + u1_i + u2_i + \epsilon_{ris}$$

Student is a matrix of covariates that includes student's gender, race/ethnicity, and grade-level. *Meeting* is a matrix of covariates that includes the fidelity measures and whether the meeting occurred during the holiday season. *Service* is a matrix of covariates describing characteristics that vary by service, including the need that the service was designed to address, whether or not the service was school-based, and whether or not the service was to an outside medical professional.

The term *time* refers to four polynomial terms that serve as a smoothing function to the baseline hazard function. The term $\mu 1_i$ is a random error term for each student, $\mu 2_i$ is a random error component for each school, and ε_{ips} is the residual error term. The model includes an exposure term, which corrects for the fact that some students have a longer observation period than others. The results are presented as incidence rate ratios (IRR), which can be interpreted as conditional hazard ratios (Rabe-Hesketh & Skrondal, 2012). A conditional hazard ratio can be interpreted as the odds that a child whose caregiver attended the meeting, for example, will receive services sooner than a child whose caregiver did not attend a meeting, all else being equal (Spruance, Reid, Grace, & Samore, 2004).

3. Results

Team meetings were disproportionately provided to males relative to females (57% vs. 43%; Table 2). Nearly half of the sample was composed of non-Hispanic Black students (49%), 32 percent non-Hispanic White students, and 10 percent Hispanic students.

Table 2
Descriptive statistics.

Variables	Mean or percent
Mean length of time until service receipt (in days)	110.2 (SD = 104.5)
Child characteristics (n = 3396)	%
Gender	
Male	57%
Female	43%
Race/ethnicity	
White non Hispanic	32%
Black Non Hispanic	49%
Hispanic	10%
Other race/ethnicity	9%
Grade-level	
Elementary School	49%
Middle or Junior High School	32%
High School	19%
Meeting characteristics (n = 3396)	
Fidelity measures	
Primary caregiver attended meeting	89%
Student attended meeting	44%
Natural support attended meeting	12%
Match between need and lead agency	40%
Support for caregiver	16%
Follow-up	
<15 days	21%
15–30 days	10%
31–45 days	7%
>45 days	62%
Number of services	2.1 (SD = 1.5)
Recommended services (n = 5151)	
Need service was designed to address	
Academic failure	11%
Academic disengagement	12%
Physical health	21%
Mental health	30%
Delinquent and criminal activity	2%
Social services	11%
Other	14%
Service location	
School-based	37%
Medical, mental health or substance use provider	25%
Community provider	38%
Recommended between November 15 and December 31	13%

Reflecting the distribution of the schools participating in CFST, 49 percent of the students attended elementary schools, 32 percent middle or junior high schools, and 19 percent attended high schools.

The extent to which the fidelity measures were incorporated varied across meetings (Table 2). Most meetings were attended by the student's primary caregiver (89%), while the student attended fewer than half (44%). The lead agency matched the student's unmet need in only 40 percent of team meetings. A minority of meetings (16%) resulted in services being recommended for the caregiver. In twenty-one percent of meetings, CFST staff followed-up with families within two weeks (21%); however, in almost two thirds of the meetings follow-up did not occur for more than a month and a half.

On average, students were recommended 2.1 services at the team meeting. The mean length of time until a service was received was a 110 days—however there was a large standard deviation of 104 days. The median length of time until service was received was 80 days.

Services were recommended most frequently for mental health issues (30%) followed by physical health issues (21%). Combined, about a quarter of the services were directly related to academic issues, including 11 percent of services aimed at academic failure and 12 percent aimed at addressing academic disengagement. Services were also recommended to address social service needs (11%), delinquent and criminal activity (2%) and other student needs (14%). The majority of services recommended for students were non-school-based, including 25 percent for medical, mental health, or substance abuse treatment providers, and 38 percent for other community-based providers.

Results from the hazard model indicated that the presence of several fidelity measures was related to a greater odds that a student would receive services sooner (Table 3). Meetings characterized by each the presence of the caregiver and the presence of the student was associated with greater odds (32% and 27%, respectively) of the service being received sooner. Meetings in which the team recommended services for the caregiver were similarly associated with a 40 percent increase in the odds that the service would be received sooner. When CFST leaders followed up with families soon after the team meeting, the recommended services were more likely to be received more quickly. For example, services that were followed up within 15 days of the team meeting were associated with a 22 times greater odds that services would be received sooner than when follow-up occurred after more than 45 days.

Each additional service that was recommended for a student was associated with a decrease in the odds that the student would receive the recommended service more quickly. After controlling for other factors in the model, services aimed at addressing academic disengagement, social service needs, and other needs were associated with a greater odds that services would be received more quickly than services aimed at preventing academic failure. Relative to services provided by non-school-based community providers, school-based services were associated with a 32 percent increase in the odds that services would be received more quickly. Contrary to our expectations, services that were recommended around the holiday season were associated with an increase in the odds that services would be received sooner than services recommended during other times.

4. Discussion

Actualizing the potential of family-centered, holistic supports for youth will require assessing which aspects of these approaches achieve desired outcomes. Timely service receipt offers the opportunity to address children's and families' immediate needs and to prevent more costly or more deep rooted needs from arising. The current study found several fidelity measures for a child and family centered team planning process that were associated with a higher probability of shortened time to receipt of recommended services. In particular, team meeting participation of the caregiver and of the student were each associated with faster service receipt, as was inclusion of support for the child's caregiver. Also as anticipated, timely follow-up by the nurse and social worker regarding recommended services was associated with a higher probability of receiving services sooner. Contrary to expectations, results did not indicate any effect of the match between the student's need and the type of agency leading child and family team meetings or of having a natural support at the meeting.

A shorter duration until service receipt for children whose caregivers were included in service plans supports the child and family team model's emphasis on addressing family needs holistically. The top two barriers to service receipt listed in the case management system were related to follow through of the student (18%) and follow through of the caregiver (43%). This may relate to the high rates of poverty in CFST schools. Anecdotally, CFST leaders reported that many families struggled to meet basic

Table 3
Hazard model results of time until service receipt: multilevel poisson regression.

	IRR	[95% Confidence interval]		*p*-Value
Child characteristics				
Male (reference = female)	1.04	[0.92	1.18]	0.55
Race/ethnicity (reference = White-non Hispanic)				
Black non-Hispanic	0.90	[0.77	1.06]	0.20
Hispanic	1.02	[0.81	1.29]	0.88
Other race/ethnicity	0.94	[0.73	1.22]	0.63
School-type (reference = elementary school)				
Middle or junior high school	0.72	[0.49	1.06]	0.10
High school	0.62*	[0.40	0.96]	0.03
Fidelity measures of team meetings				
Primary caregiver attended meeting	1.32*	[1.02	1.71]	0.03
Student attended meeting	1.27**	[1.10	1.48]	0.00
Natural support attended meeting	0.99	[0.82	1.19]	0.89
Match between need and lead agency	0.97	[0.84	1.12]	0.68
Support for caregiver	1.40**	[1.17	1.68]	0.00
Follow-up (reference >45 days)				
<15 days	21.55**	[18.16	25.57]	0.00
15–30 days	8.49**	[7.07	10.19]	0.00
31–45 days	5.21**	[4.30	6.32]	0.00
Number of services recommended	0.87**	[0.82	0.93]	0.00
Recommended services				
Need (reference = academic failure)				
Academic disengagement	1.44**	[1.14	1.81]	0.00
Physical health	1.19	[0.96	1.49]	0.12
Mental health	1.12	[0.91	1.37]	0.29
Delinquent and criminal activity	1.14	[0.71	1.83]	0.60
Social services	1.77**	[1.38	2.27]	0.00
Other	1.25*	[1.01	1.56]	0.04
Service location (reference = community provider)				
School-based service	1.33**	[1.16	1.52]	0.00
Medical, mental health or substance use provider	1.02	[0.87	1.20]	0.79
Recommended between November 15 and December 31	1.24*	[1.04	1.49]	0.02

* $p < 0.05$.
** $p < 0.01$.

needs. Given children's reliance on caregivers, it appears that addressing caregiver needs is one way to expedite service access for children. Future research might probe what types of support for caregivers best facilitates children's initial service access as well as continued use of services until their needs are met. Including caregivers and children in meetings may also expedite service use both by improving the team's information about their needs and preferences, and by increasing their commitment to the service plan.

Prompt follow up by CFST leaders—especially within two weeks of the CFST meeting—was also strongly associated with a higher odds of receiving services sooner. Although this finding may seem obvious, it was striking to us how infrequently CFST leaders reported following up this quickly about recommended services. We believe this finding indicates the roles of adequate staffing and accountability in ensuring that CFST plans are implemented.

Several plausible reasons may explain the lack of findings related to the match between the student's primary unmet need and the lead agency of the CFST meetings with the odds of service receipt. Direct agency participation in CFST meetings may not have been necessary because referrals were already successful: CFST leaders generally reported success in securing services from community agencies (Wells & Gifford, 2013). Such success may still have been partly attributable to CFST leader coordination with community agencies in general. However, here, we were testing the CFST expectation that participation of all relevant agencies in each team meeting was important. The fact that agency participation did not affect speed of service receipt is potentially important, suggesting that this expensive facet of the CFST theory of change might be revisited. However, including representatives of different agencies may have other implications which this study does not capture, including identifying children's needs accurately and supporting families in continued service engagement over time. Additional research should examine how team participation affects these other key outcomes.

The finding that students for whom more services were recommended had a longer duration until service receipt is particularly germane for the evaluation of this program that is designed to facilitate interagency collaboration (e.g. between the schools and community partners). For a sample of youth and families with complex needs, it is not known the extent to which participation in the CFST program may have reduced barriers. However, it is noteworthy that this high needs population may be particularly vulnerable to being underserved. Finally, it is possible that children were more likely to receive services recommended during the holiday season because caregivers had more time off work and hence the ability to take the children to appointments; again, future research would be necessary to test this speculation and identify potential implications for improving access during the remainder of the year.

CFST involves a series of steps including identifying students, engaging families' participation, assembling the team, developing a plan, and promoting access to services, all of which should in theory culminate in improved outcomes. The current study focuses on the link between the fidelity of CFST meetings themselves and timely service receipt. As an outcome, timely service receipt is potentially a systems level indicator of access to services, with applicability across a range of services and settings. In addition, we believe that for evaluation of the extent to which the CFST programs meets its System of Care philosophical goals, the fidelity measures proposed here are valid indicators.

This study's findings have implications for program managers. First, administrative data on time until receipt of services is a real-time indicator of both access to care for families and the program's ability to help coordinate care. Staff and managers can use this

indicator to assess potential problems with access quickly and work with families, staff, and interagency partners to help reduce time until service receipt for individual children. Program staff can also use these data to help front line staff reflect on and improve operations. Second, this outcome measure has broad applicability to a range of services for different student needs. Therefore, system level managers can compare and contrast average time until service receipt across providers or across communities and consider reasons why some services may be more or less accessible. The generalizability of this measure can facilitate cross-system comparisons by managers, as well as research that may yield new insights into access barriers and facilitators.

Overall, we believe that the current study demonstrates the effectiveness and efficiency of administrative data for evaluating a family centered team approach to supporting vulnerable children. The case management system has the clear purpose of supporting accountable service planning for individual children and includes measures of key facets of the CFST theory of change. The data collection was designed to match the CFST leaders' workflow, e.g., logging who attended the meeting and the date it occurred. Resulting information enables CFST leaders to track individual children's progress, and aggregated data can be broken out into scores reflecting each school's fidelity to program goals. Reports of these measures aggregated to the school and school district levels are also easily interpretable across multiple program end users such as the state coordinator, principals, supervisors, and the nurses and social workers. Finally, unlike the Wraparound Observation Form-2 (Nordness & Epstein, 2003), which required training, a manual describing how to rate each item, bi-monthly meetings with the study author, and an outside observer to attend meetings, the fidelity measures here relied on a single informant who was already a participant in the program.

Despite these advantages of the case management system for fidelity measurement, there are limitations. First, the relevance of current analyses hinges on the strong underlying assumption that the services to which youth and families are referred are effective. As previous research on Systems of Care has demonstrated, service receipt is not necessarily sufficient to improve youth outcomes (Bickman, Smith, Lambert, & Andrade, 2003). The most common services recommended through CFST were private mental health or medical services and support for caregiver, yet the evidence base for these services which are disconnected from the schools is not well established (Greenberg et al., 2003). Each service program to which youth and families are referred warrants its own evaluation, with outcomes tailored to the goals of that service.

A second limitation is the reliance on a single informant such as the CFST nurse or social worker provides a more limited vantage point for understanding factors that modify program effectiveness than alternatives that draw on multiple participant perspectives. In particular, empowering the voices of vulnerable children and families may offer great insight to providing services that best meet their needs. The fidelity measures used in this study thus do not capture some of the elements that tools such as the Wraparound Fidelity Index and the Wraparound Observation tool include, such as family voice and choice, effective teamwork, and cultural competence. Effective measures capture core programs elements, and our reliance on administrative data may lose some information richness that would be gained through observation or through interviews.

Measuring program fidelity has been gaining acceptance as a critical step in program evaluation that should precede examining program outcomes. Implementing a program, coupled with an outcomes evaluation, is typically very expensive. Many programs have failed to deliver the benefits to participants that they set out to achieve. Unfortunately, many prior studies have failed to track fidelity measures, limiting our knowledge as to why the program failed to achieve these desired effects. Research aimed at developing and incorporating effective and efficient fidelity measurement into program evaluation could help us leverage more knowledge from ongoing studies.

5. Lessons for evaluators

Evaluators are often challenged to find low cost strategies under short time frames to measure program fidelity and outcomes. Case management systems can complement more traditional data collection tools and provide an opportunity to collect different kinds of information. The case management system in this study was designed to monitor the extent to which actual work processes reflected the authorizing legislation's theory of change, using data captured during natural junctures of these processes. Program developers may overestimate the extent to which frontline workers will adopt a new pattern of work when an organization implements a new innovation. The case management system allowed evaluators to track key elements and to provide supervisors and their staff information on monthly activities. Case management systems provide a highly scalable means for tracking similar activities that are occurring on differing timeframes or in different organizations. This study demonstrates that fidelity measures derived from administrative database may complement the rich information derived from observation, interviews, and surveys to improve program development and measures outcomes.

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