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Factors Affecting Long-Term Outcomes Following Intensive In-Home Services

Abstract

Intensive in-home services (IIHS) work with families toward building skills and resources to better manage their children with behavioral difficulties. Factors that impact long-term outcomes following IIHS are not well understood. This study examined the relative importance of youth demographic and clinical characteristics, family history variables, characteristics of program participation, and organizational-level factors in explaining placement stability, educational progress, and contact with legal authorities one year following discharge from IIHS.

The sample included all youth who received IIHS, were discharged between January 1, 2001 and December 31, 2006, and completed a follow up at one-year post-discharge ($n = 2,649$) from a large provider of IIHS. Hierarchical linear modeling (HLM) was employed to test the relationship between case characteristics and outcomes, as youth were nested within offices. The non-experimental nature of the study demanded close attention to the issue of response bias. Logistic regression was used to model the probability of responding to the postdischarge survey, with the predicted values used in the HLM analysis to correct for response bias.

Adolescent males were found to have significantly lower odds of placement with their family, higher odds of contact with legal authorities and out of home placement, and lower odds of a positive composite outcome than adolescent females. Youth of both genders with antisocial behavior had significantly lower odds of positive outcomes. Length of service was significantly associated with higher odds of negative outcomes for all dependent measures except contact with legal authorities. This last finding was unexpected and may be a function of unmeasured risk factors that affect both length of service and long-term outcome. Office-level characteristics were not found to be significant predictors in most of the models.

Recommendations for improvement of the intensive in-home services program included focusing resources on high-risk clinical characteristics rather than changing organizational attributes such as size and turnover. Although a high rate of turnover potentially has other negative consequences, finding more effective ways to treat antisocial behavior, particularly in males ages 10 to 16, may be the activity most likely to secure higher odds of positive outcomes for youth served by the program.

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**FACTORS AFFECTING LONG-TERM OUTCOMES
FOLLOWING INTENSIVE IN-HOME SERVICES**

A Dissertation
Presented for
The Graduate Studies Council
The University of Tennessee
Health Science Center

In Partial Fulfillment
Of the Requirements for the Degree
Doctor of Philosophy
From The University of Tennessee

By
Sarah Hurley
December 2008

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DEDICATION

This work is dedicated to those who struggle with behavioral and emotional disorders with the hope that it will, in some small way, help provide better services so that more children and families can live successfully.

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This work would not have been possible without the amazing support of my family, the continuous encouragement of those at Youth Villages, the extraordinary assistance of my committee, and the generous spirit of others who helped me along the way.

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ABSTRACT

Intensive in-home services (IIHS) work with families toward building skills and resources to better manage their children with behavioral difficulties. Factors that impact long-term outcomes following IIHS are not well understood. This study examined the relative importance of youth demographic and clinical characteristics, family history variables, characteristics of program participation, and organizational-level factors in explaining placement stability, educational progress, and contact with legal authorities one year following discharge from IIHS.

The sample included all youth who received IIHS, were discharged between January 1, 2001 and December 31, 2006, and completed a follow up at one-year post-discharge ($n = 2,649$) from a large provider of IIHS. Hierarchical linear modeling (HLM) was employed to test the relationship between case characteristics and outcomes, as youth were nested within offices. The non-experimental nature of the study demanded close attention to the issue of response bias. Logistic regression was used to model the probability of responding to the postdischarge survey, with the predicted values used in the HLM analysis to correct for response bias.

Adolescent males were found to have significantly lower odds of placement with their family, higher odds of contact with legal authorities and out-of-home placement, and lower odds of a positive composite outcome than adolescent females. Youth of both genders with antisocial behavior had significantly lower odds of positive outcomes. Length of service was significantly associated with higher odds of negative outcomes for all dependent measures except contact with legal authorities. This last finding was unexpected and may be a function of unmeasured risk factors that affect both length of service and long-term outcome. Office-level characteristics were not found to be significant predictors in most of the models.

Recommendations for improvement of the intensive in-home services program included focusing resources on high-risk clinical characteristics rather than changing organizational attributes such as size and turnover. Although a high rate of turnover potentially has other negative consequences, finding more effective ways to treat antisocial behavior, particularly in males ages 10 to 16, may be the activity most likely to secure higher odds of positive outcomes for youth served by the program.

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CHAPTER 1: INTRODUCTION

1.1 Overview

Improving the efficacy and effectiveness of mental health services for youth is a critical need in this country. More than 17 million youth in the US struggle with behavioral or emotional disorders (Angold, Erkanli, Farmer, & Fairbanks, 2002; Office of the Surgeon General, 2001). As many as 80% of these youth do not receive adequate or appropriate treatment for their conditions (Kataoka, Zhang, & Wells, 2002; Office of the Surgeon General). Costs of treatment for these conditions were estimated at \$11.86 billion in 1998 (Ringel & Sturm, 2001), with a substantial portion of these expenditures for restrictive mental health and juvenile justice placements (Lyons, Libman-Mintzer, Kisiel, & Shallcross, 1998; US Department of Health and Human Services, 1999) that have little evidence of producing positive long-term outcomes for youth (Burns & Hoagwood, 2002). Without effective treatment, youth are at increased risk of multiple negative consequences, including placement out of their homes in restrictive settings, school failure, and juvenile delinquency.

While restrictive mental health and juvenile justice placements are common responses to youth with severe emotional and behavioral disorders, the lack of evidence for the effectiveness of these treatments, along with the high cost, has long fueled a search for alternative treatment modalities (Sieracki, Leon, Miller, & Lyons, 2008; Stroul & Friedman, 1996). Outpatient therapy, partial hospitalization, day treatment, and in-school programs have all attempted to address the mental health needs of youth outside of restrictive placements. Intensive in-home services (IIHS), characterized by delivery of short-term but highly intensive mental health services in the youths' home, sought to effectively address the mental health needs of youth while avoiding placement of youth away from their family. Providing services within the context of the youth's natural environment using an ecologically-based approach, that is, one that recognizes and mediates the reciprocal influences of multiple domains such as family, school, community, peer, and individual factors (Bronfenbrenner, 1979), has held promise as an effective way to produce long-term positive results for youth struggling with behavioral and emotional disorders.

Multisystemic Therapy (MST) is an IIHS that has demonstrated considerable success as an alternative to restrictive placements in addressing the behavioral health needs of youth. Employing an ecologically-based intensive in-home approach, this model utilizes a single counselor per family who is held responsible for assisting that family to build a sustainable support structure for their child. The model incorporates structured supervision, consultation, and training to ensure model fidelity and treatment quality. Numerous clinical trials of MST have shown sustained reduction in anti-social behavior (Henggeler, Melton, Smith, Schoenwald, & Hanley, 1993; Schaffer & Borduin, 2005), reduced contact with juvenile authorities (Ogden & Halliday-Boykins, 2004), improved school retention (Brown, Henggeler, Schoenwald, Brondino, & Pickrel, 1999), and avoidance of out-of-home placements in restrictive juvenile justice and/or mental health settings (Schaffer & Borduin; Schoenwald, Ward, Henggeler, & Rowland, 2000), although not all MST studies have demonstrated long-term reductions in referral behaviors (Henggeler, Rowland, Halliday-Boykins et al., 2003). In addition, a meta-analysis of the MST studies using the review principles of the Cochrane Collaboration found virtually no evidence of the effectiveness of MST (Littell, Popa, & Forsythe, 2007).

Questions have also been raised concerning the effectiveness of other intensive family preservation services, with methodological and measurement issues at the center of much of the discussion (Davidson-Arad, 2005; Lindsey, Martin, & Doh, 2002).

This study examined an IIHS program that was implemented in 1994 by Youth Villages (YV), one of the largest not-for-profit behavioral health services organizations in the southeastern US. The IIHS Program is part of the agency's continuum of care that includes residential treatment, group homes, and therapeutic foster care, and reflects the agency's stated value that children are best raised by their families (Youth Villages, 2007). The IIHS Program at YV encompasses both an MST Program and the Intercept Program, which provides intensive in-home services to a different population of youth than the MST Program. While counselor activities and the supervision and consultation model implemented at YV were consistent with MST principles across the study period, the range of youth served in the program was broader than the population served in the original efficacy trials of MST. The original MST trials worked primarily with youth referred specifically for treatment of anti-social behavior. The Intercept Program at YV, in addition to treating antisocial behavior, often has focused on reunification of youth with their biological family after an extended period in an out-of-home placement (usually residential treatment or foster care) or on prevention of placement of youth away from their families. Youth from both the MST and Intercept programs were included in the study sample.

While evidence concerning the effectiveness of various high-fidelity IIHS programs is available (Henggeler et al., 2003), significant questions remain about the influence of youth, family, program, and organizational factors on long-term outcomes such as placement stability (remaining in a stable home environment, avoiding lengthy placement in restrictive juvenile justice or treatment settings), educational progress, and contact with legal authorities. Aside from an understanding of the relative contribution of each of these factors, recent developmental literature has suggested that mental health disorders in children and adolescents may be different and thus, may need to be examined separately (Rao et al., 2007). Understanding the relationship of the aforementioned factors to long-term outcomes is critical, as this knowledge may be exploitable in maximizing positive long-term outcomes through facilitation of targeted program improvement. Community-based agencies need to know, for example, whether to make programmatic changes to address particular youth risk factors, to invest in counselor retention strategies, or to expend resources in developing and sustaining high-quality program leadership staff. All of these activities may be laudable, but with limited resources, they may not all be feasible. This study will provide guidance regarding the actions most likely to increase the probability of positive long-term outcomes for youth who receive IIHS.

1.2 Statement of the Problem

A chasm exists in this country between the need for effective mental health services for children with behavioral and emotional disorders and the provision of efficacious, cost-effective services that produce positive long-term outcomes for children and families. Current services are often focused on restrictive mental health and juvenile justice placements and/or removal of children from their families into placements in state custody. The effectiveness of current services in producing positive long-term

outcomes has been seriously questioned, as has the wisdom in spending substantial portions of public mental health dollars on such services.

Alternatives to out-of-home placements have developed in response to concerns about the impact of treatment options that remove youth from their families and place them in restrictive settings. IIHS, an ecologically-based systems approach to treating behavioral and emotional disorders in youth, has accumulated substantial evidence of effectiveness in producing positive long-term outcomes in the areas of placement stability and restrictiveness, school performance, and avoidance of trouble with the law (Henggeler et al., 2003; Kirk & Griffith, 2004; Miller, 2006), although debate continues concerning the actual impact of these types of services (Fraser, Nelson, & Rivard, 1997; Lindsey, Martin, & Doh, 2002; Littell, 2005). In addition, the factors that influence these outcomes, whether the outcomes are positive or negative, are not well understood at this time.

1.2.1 Need for Children's Mental Health Treatment

There is substantial need for efficacious and cost-effective treatments for children's behavioral and emotional disorders. Among the 17 million children who struggle with behavioral disorders in the US (Angold, Erkanli, Farmer et al., 2002; Office of the Surgeon General, 2001), it is estimated that only 20% receive adequate and appropriate treatment (Office of the Surgeon General). This leaves some 13 million children in the United States without the care they need for their behavioral and emotional disorders (Kataoka et al., 2002). While stigma associated with mental illness accounts for some of the under-treatment of these disorders (New Freedom Commission on Mental Health, 2003), a lack of access to effective community-based treatment is a significant factor in explaining the unmet need (Glisson & Green, 2006). Youth with untreated mental illness are at significantly increased risk for a number of negative long-term outcomes, including school failure (Zima et al., 2000), juvenile delinquency (Deas & Thomas, 2002), and entry into state custody (Snyder & Sickmund, 2006).

1.2.2 Current Practices in Children's Mental Health Treatment

Both the Surgeon General's report in 1999 (U.S. Department of Health and Human Services, 1999) and the President's New Freedom Commission on Mental Health (2003) emphasized the importance of implementing evidence-based practices and monitoring program performance in order to improve youth and family outcomes. Additionally, reports by the Office of Juvenile Justice and Delinquency Prevention (Henggeler, Mihalic, Rone, & Thomas, 1998) and the Substance Abuse and Mental Health Services Administration (Hoagwood, 2003) identified specific interventions as 'best practices' in addressing behavioral and emotional disorders in children. These documents encouraged funders of children's mental health services to hold service providers accountable not only for the quality of their services but for the long-term outcomes achieved by the youth they serve.

The latest figures reveal that more than 600,000 children annually have been placed in out-of-home care. This figure includes youth in state custody (510,000 youth in 2006; US Department of Health and Human Services, 2008), as well as youth placed in residential facilities in the juvenile justice system (96,655 youth in 2003; Snyder &

Sickmund, 2006). Youth with severe emotional and/or behavioral disorders are at increased risk of placement in state custody and away from their families, either because families cannot manage the youths' behaviors or because placement into state custody is seen by families as the only option for obtaining appropriate services for their child (New Freedom Commission on Mental Health, 2003). Unfortunately, many of the services provided in out-of-home placements demonstrate little evidence of effectiveness in securing long-term positive outcomes such as placement stability, educational progress, and avoidance of contact with legal authorities. For example, services provided in residential treatment centers and psychiatric hospitals have not been shown to result in positive long-term outcomes for youth (Burns & Hoagwood, 2002). Likewise, services provided in juvenile detention and correctional facilities appear ineffective, as recidivism rates (rearrest within a year) have been estimated at 55% (Snyder & Sickmund).

The need for increased home- and community-based alternatives to out-of-home placements continues to be a clarion call throughout the fields of child welfare and children's mental health. Lack of availability of home- and community-based services is a frequently cited reason for the large number of youth in out-of-home care (New Freedom Commission on Mental Health, 2003; Stroul & Friedman, 1996). Partly in response to the perceived need, the Centers for Medicare and Medicaid Services recently awarded \$218 million to 10 states to study the impact of home- and community-based alternatives to psychiatric residential treatment facilities, both in terms of functional outcomes for children and cost to state Medicaid programs (Centers for Medicare and Medicaid Services, 2008). Although home- and community-based services are not inexpensive, the positive economic impact of decreasing juvenile delinquency and preventing out-of-home placement has been shown, in some implementations, to outweigh the cost of services (Miller, 2006). For this reason, the widespread implementation of IIHS has the potential to address a substantial portion of the need for treatment of behavioral and emotional disorders in children (Schaffer & Borduin, 2005).

1.3 Conceptual Framework

The provision of mental health services to children and adolescents occurs within a complex web of private agencies, funding sources, mental health centers, juvenile justice entities, and health care providers. In addition to youth and family characteristics, there are numerous other factors that simultaneously influence access to and availability of mental health services, as well as outcomes produced by those services. Recovery from mental illness has been identified as the goal of treatment (New Freedom Commission on Mental Health, 2003), thus, effective services are likely to bring about long-term positive change in youth, resulting in a higher likelihood of placement stability, appropriate educational progress, and avoidance of contact with legal authorities. The effectiveness of a particular treatment modality or service depends on a multitude of factors, including youth and family characteristics, program activities, and organizational attributes. Analysis of factors that influence the long-term impact of mental health services must take into account the multilevel nature of these factors.

1.4 Purpose of the Study

One step in meeting the challenge of providing effective treatment to all children with behavioral and emotional disorders is to target resources toward services that have demonstrated positive long-term results with specific populations and to focus program improvement efforts on the areas that have the greatest impact on long-term outcomes. The purpose of this study is to increase understanding of the importance of various multilevel factors that influence long-term outcomes following IIHS. This will allow for focused interventions in those areas most likely to result in substantial outcome improvements. By providing information to fuel program improvements and broadly disseminating information on factors related to long-term outcomes, this study will take a step toward meeting the need for effective treatment of youth with behavioral and emotional disorders.

1.5 Specific Aims and Hypotheses

To date, studies investigating outcomes of in-home services have focused on one or two particular sets of factors or levels of influence, rather than considering their simultaneous impact on long-term outcomes. Using clinical data uniquely suited to this study from one of the largest IIHS providers in the country, powerful statistical tools available through multilevel modeling were employed to clarify the contributions of the various factors. This information was intended to fill a critical gap in current knowledge by providing guidance as to the most appropriate avenues for creating more effective services. To that end, this study examined the relative importance of youth demographic and clinical variables, indicators of program activities, and office-level variables in explaining placement stability, educational progress, and contact with legal authorities one year following discharge from IIHS, both for children and for adolescents.

The specific aims and hypotheses of this project are as follows:

1. To identify the relative contribution of specific youth, family, program, and organizational characteristics to long-term outcomes (placement at one-year postdischarge, educational progress, contact with legal authorities, out-of-home placements, and composite outcome measure) following intensive in-home services.

Hypothesis - Program activities and organizational characteristics will exert the strongest influence on outcomes at one-year postdischarge from intensive in-home services.

2. To determine whether the relationships between youth, family, program, and organizational characteristics and long-term outcomes (placement at one-year postdischarge, educational progress, contact with legal authorities, out-of-home placements, and composite outcome measure) are the same for children (less than 13 years old) as they are for adolescents (13 to 18 years old)

Hypothesis - Youth level characteristics will have a more significant impact on outcomes at one-year postdischarge for adolescents than for children.

Regarding the hypothesis arising out of the first specific aim, many of the factors examined in the current project have been shown to be associated with outcomes following services (see sections 2.1 and 2.3 for further details), although most have been studied in relative isolation. Little consensus has emerged regarding the relative importance of specific factors. Given the substantial body of evidence demonstrating the positive relationship between length of service and outcome (Angold, Costello, Burns, Erkanli, & Farmer, 2000; Lindsey, Martin, & Doh, 2000), as well as the demonstrated importance of organizational level variables on service outcome (see section 2.2.2 for further details), it was hypothesized that program and office characteristics would have a greater impact on services than individual characteristics.

Adolescence has been clearly identified as a separate developmental stage from childhood, despite the difficulty in pinpointing the precise beginning and end points of this period (Kazdin, 1993). As adolescents move toward independence, it is possible that youth level characteristics, such as age, involvement in antisocial behavior (runaway, substance abuse, delinquency, aggression, and association with negative peers), and family history of substance abuse, mental illness, or legal involvement may become more significant predictors of long-term outcomes than program or organizational factors.

CHAPTER 2: REVIEW OF THE LITERATURE

Intensive in-home services (IIHS) in general, and Multisystemic Therapy (MST) in particular, have developed out of a long tradition of family preservation services. The desire to keep families together has been a driving force in children's services for more than 100 years (Child Welfare League of America, 2008; Fraser et al., 1997; Lindsey et al., 2002). The history of intensive family preservation services (IFPS) to prevent the placement of children in substitute care has been long (Kinney, Madsen, Fleming, & Haapala, 1977). Such services became widespread (Bitonti, 2002; Child Welfare League of America, 1989; Nelson, Landsman, & Deutlebaum, 1990; Staudt & Drake, 2002) at least partially in response to requirements in the Adoption Assistance and Child Welfare Act of 1980 (PL 96-272) that 'reasonable efforts' must be made to avoid out-of-home care (Schuerman, Rzepnicki, & Littell, 1994).

There remains, however, substantial debate about the effectiveness of these services in preventing placements. The early work of program developers and advocates, which provided reports of significantly lower placement rates (Pecora, Fraser, & Haapala, 1992), gave way to large-scale demonstration projects that incorporated a higher level of technical, methodological, and statistical sophistication, but which yielded substantially less positive results (Lindsey et al.; Schuerman et al.). One reason for the lack of demonstrated effectiveness may have been the short-term crisis-oriented focus of the intervention which might not have been adequate to address the more enduring problems of many of the families (Barth, 1988). At the current time, some IFPS programs remain brief, providing four to six weeks of service, while others have lengthened to four to six months. Still other incarnations of IFPS are experimenting with other configurations, including booster sessions following the completion of a more intensive phase of treatment.

2.1 Antecedents of Intensive In-Home Services – Intensive Family Preservation Services

Intensive family preservation services have taken a variety of forms over the years. Most programs are short (three months or less) but intensive (at least three contacts per week, up to 15 hours of service per week), feature low caseloads for front-line staff, and focus on the development of adequate structure and skills within the family to manage the identified child's disruptive behavior. Homebuilders®, founded in 1974 (Kinney et al., 1977), was one of the earliest IIHS models to focus on prevention of out-of-home placements (Pecora et al., 1992). The Teaching-Family Model (TFM), which was originally designed as a training program for group home parents, was adopted as an intensive family preservation service (Lewis, 2005). Focused on parental skill-building and meeting concrete needs, TFM teaches parents to use contingency management to improve the quality of their interactions with youth.

Evaluations of these programs, based on prevention of out-of-home placements among participants, have produced mixed results, with some showing significant positive long-term impact (Lewis, 2005) and others finding either mixed results or little evidence of effectiveness (Barton, Baglio, & Braverman, 1994; Littell & Schuerman, 2002; Dagenais, Begin, Bouchard, & Fortin, 2004). One of the most extensive evaluations of intensive family preservation services was completed as part of a large-scale

dissemination project in Illinois (Schuerman et al., 1994). A complex three-tiered research design provided multiple perspectives on the implementation of the Families First program, including a randomized controlled trial in which nearly 1,000 families were enrolled in IIHS services and more than 500 families received regular child welfare services. The results were disheartening, at best, for those who put stock in the earlier reports of program success.

According to the evaluation, the Families First program had no effect on placement prevention, subsequent maltreatment, length of service in foster care or likelihood of re-entry into the child welfare system. A 'net-widening' effect was observed on the state's child welfare system, i.e. more cases were opened in the public system during program operation. In addition, service activities (length of service, contacts with workers, number of services provided) were not correlated with placement rates, subsequent maltreatment, or case closing. Some differences in family functioning were found, but these were not stable over time. This finding of a decided lack of effectiveness in achieving the stated goals of IFPS was echoed in three other large-scale evaluations that came to the same general conclusions (Lindsey et al., 2002; Rossi, 1992). Subsequent studies provided little support for the early contentions of the effectiveness of these services (Blythe, Salley, & Jayarante, 1994; Cash & Berry, 2003; Littell, 1997; Rubin, A., 1997; Woolfenden, Williams, & Peat, 2001). Yet, these types of very short-term services continue to be offered as "effective strategies" for addressing the needs of children and families in the child welfare system.

Partly in response to the failure of large-scale studies to produce evidence of the effectiveness of IIHS services, researchers began to examine the extant literature more closely to discern potential methodological issues that might account for the spectacular lack of encouraging findings. Fraser, Nelson, and Rivard (1997) carried out an ambitious meta-analysis of IFPS studies conducted since 1985. They were unable to determine, however, whether the studies had failed to demonstrate success at preventing placements, or, rather, had failed to detect the success of the programs in preventing placements. Contrary to expectations, small studies with low statistical power seemed better able to detect positive effects than larger, more powerful studies. This finding was echoed in later work that classified 36 studies according to their methodological rigor (Lindsey et al., 2002), which found that the four studies of family preservation services deemed to be of the highest quality all failed to find positive effects on placement prevention. As the authors stated, "only when the research study was so deficient so as to be almost 'descriptive' in nature, did the results appear to support the program" (p. 764).

The lack of evidence on the effectiveness of family preservation services has been attributed to several causes. Wide variability on key characteristics among the treatment groups in larger studies has been demonstrated (Fraser et al., 1997), making identification of between-group differences more challenging. A lack of adherence to basic IFPS elements at some treatment sites also presented difficulties in clearly demonstrating treatment effects (Fraser et al.). In addition, Lindsey, Martin, and Doh (2002) identified factors that contributed to the inability of family preservation services to show superior treatment effects including reliance on a casework intervention (which has never been demonstrated to be effective), the inability to target high-risk children (thus increasing the difficulty in detecting treatment effects), implementing a 'one size fits all' approach that does not adequately address the multiple challenges of families who often present to child welfare agencies, use of a limited intervention period (when the

psychotherapy literature has demonstrated a fairly convincing relationship between length of service and outcomes), and a failure to address the issue of poverty. This last topic has been raised by others who have demonstrated that family preservation services are less effective with those in poverty (Eamon, 1994; Eamon & Kopels, 2004; MacLeod & Nelson, 2000).

More recent work has been directed at clarifying some of the ambiguities found in earlier studies. Kirk and Griffiths (2004), in an attempt to address specific methodological problems in earlier studies, utilized event history analysis to examine the experiences of more than 30,000 children, 542 of whom had received IFPS. The results indicated a significant positive effect for the IFPS group and demonstrated how previous studies missed this conclusion. A potential 'window of vulnerability' was also identified, suggesting that program 'booster shots' may be needed to sustain the positive outcomes over a long period of time. In addition, data from at least one of the large-scale implementations of family preservation services has been re-examined to investigate questions regarding variability in the effectiveness of the intervention across population subgroups (Ryan & Schuerman, 2004) and to describe the relationship between case characteristics and outcomes (Littell, 2001).

Most recently, data on IFPS programs have been revisited to discern the relationship between model adherence and program effectiveness (Miller, 2006). The reanalysis found that services delivered in accordance with the principles of the Homebuilders© program have a significant positive, but small, effect on out-of-home placements, which translates into substantial societal savings from decreased crime, child abuse and neglect, substance abuse, and out-of-home placements, as well as increased high school graduation and test scores. The study used of a weak post-hoc measure of fidelity to the Homebuilders© model, however, raising questions concerning the influence that the reviewers prior knowledge of the success of the program may have had on its classification as having "fidelity", as well as concerning the true cost-effectiveness of the services.

2.2 Context of Intensive In-Home Services

The provision of IIHS occurs within a broader context that can impact both the delivery of services and the outcomes experienced by youth and their families following IIHS. First, developmental issues are important because of the incredible physical, mental, and emotional growth that takes place over the period from birth to 17. As a result IIHS must take into account the developmental level of each youth served, as long-term outcomes are likely to be influenced by developmental issues as well. In addition, organizational factors have been shown to influence both service delivery and long-term outcomes in a variety of ways. Examining the manner in which organizational variables operate is essential in determining the importance of these factors as predictors of long-term outcomes. Finally, IIHS can only be understood within the context of the ways in which it has been measured and studied. The operationalizations both of outcomes and of various factors influencing those outcomes have substantial impact on the current knowledge base regarding behavioral health services.

2.2.1 Developmental Issues in Behavioral Health Services

Youth development occurs as a result of interactions between the youth and her environment. The rate of growth in competency in developmental tasks can often be linked to the support and structure provided by the youth's environment (Matsen & Coatsworth, 1998). Some environments encourage development of competence in a variety of tasks, while others do not afford such opportunities. The ecological focus of most IHS programs fits well with this understanding of youth development. Within an ecologically-based program, the task of counselors is to assess the environmental drivers of behavioral difficulties and provide assistance to those within the child's ecology to increase the opportunities for behavioral control and accomplishment of developmental tasks.

IHS programs have been used with youth across the age spectrum. Within the psychological literature, the terms children and adolescents are sometimes used interchangeably or grouped together under the more general term of 'youth' (see, for example, Bennett, 2008; Hoagwood, Jensen, Petti, & Burns, 1996; Leichtman, 2006), with no distinctions made between these groups in terms of their developmental needs or accomplishments. Many researchers do, however, see a distinction between younger and older youth (Weisz & Hawley, 2002), although a precise boundary between childhood and adolescence is extremely difficult to identify.

Most mental health treatments that are provided to adolescents were developed either for adults or children. 'Downward' adaptation of adult treatments and 'upward' adaptation of treatments for children usually involve some adjustments for the particular presenting issues, skills, and needs of adolescents. Of the 25 interventions included on a list of 'empirically supported treatments' examined by Weisz & Hawley (2002), only 14 included adolescents in the development and testing of the model. Seven of these 14 were originally designed for adults, while six began as treatments for younger children. MST is one of the few evidence-based treatment models that was developed specifically for and tested with adolescents (Weisz & Hawley).

Two of the major differences between children and adolescents that are relevant to the effectiveness of behavioral health treatment involve their motivation and cognition (Weisz & Hawley, 2002). Adolescents are neither 'big children' nor are they 'small adults'. Adolescents may be far more oriented toward their peer group than adults and may have little motivation to actively participate in therapy (Dishion, McCord, & Poulin, 1999; Kazdin & Mazurick, 1994; Weisz & Hawley, 2002). The cognitive capabilities of adolescents fall along a broad range, depending on their age, intellectual ability, exposure to rich learning environments, and physical development. Both their motivation and cognitive levels need to be assessed early in the course of any intervention, as these factors are likely to impact the effectiveness of treatment.

The ability to accurately communicate thoughts, feelings, and experiences is another area that differentiates children from adolescents. In a study of the reliability of child reports of mental health symptoms, Edlebrock, Costello, Dulcan, Kalas, and Conover (1985) found that children as young as 10 could reliably report symptoms, while children in the six-to-nine age category were not reliable in reporting symptoms other than simple fears. Clinical interviewing of young children may still hold value in terms of establishing rapport or assessing functional status, although clinicians are well advised to utilize multiple information sources during diagnosis and treatment planning for young

children. The ability of adolescents to provide reliable information opens a whole range of activities and interventions to the therapist; if an adolescent has developed the capability of abstract reasoning and consequential thinking, therapists can intervene in ways that utilize these skills to change behaviors (Weisz & Hawley, 2002).

One of the characteristics ideally found in IIHS is extensive assessment and subsequent tailoring of interventions to the specific dysfunction, given the observed environment within which the issue is occurring. For youth presenting with aggression, for example, a competent counselor would assess the triggers for the aggressive behavior, identify conditions within the environment that promote the aggressive behavior, then apply interventions to reduce or eliminate those conditions with the expectation that the aggressive behavior will decrease. The effectiveness of the interventions will, of course, be impacted by the motivation of the individuals involved (both the youth and those in their environment) to actively participate and to change their behaviors. Interventions designed for a 10-year-old are likely to differ from those chosen for a 16-year-old. It is important to note that two 16-year-olds may well need entirely different interventions if the conditions that promote their aggressive behavior are different. The actual interventions implemented with youth may vary but the effectiveness of IIHS should remain fairly constant across both children and adolescents. Thus, the importance of factors related to long-term success following such services may well differ between children and adolescents.

2.2.2 Organizational Issues in Behavioral Health Services

IIHS does not occur in a vacuum. Services are delivered by workers who are operating within the context of the organization for which they work, which is embedded within the larger network of social service organizations within a community. While child and family characteristics are essential factors in understanding outcomes of services, “the effectiveness of family preservation (or any other service) cannot be examined without attention to the larger service context” (Staudt & Drake, 2000, p. 647).

Organizational factors have been demonstrated to contribute significantly to explaining variance within client outcomes when services were delivered by multiple agencies (Yoo & Brooks, 2005). Measures of organizational functioning such as supervisor support, organizational climate/culture, or worker satisfaction (see, for example, Clarke, 2002; Gifford, Zammuto, & Goodman, 2002; Glisson & James, 2002; Laschinger, Shamian, & Thomson, 2001; Platanova, Hernandez, Shewchuk, & Leddy, 2006), and measures of structural aspects of organizations including size, staff turnover, aggregate educational level (percent degreed staff), and collaboration with other agencies (Littell & Tajima, 2000; Provan & Sebastian, 1998) have both been shown to impact service delivery and client outcomes in a wide variety of settings. Given some of the specific features of IIHS, including delivery of services by a single counselor, highly structured supervision, and an ecological focus that directs counselors to work with all systems affecting a youth’s behavior, organizational factors may shed substantial light on outcomes that are observed across a population receiving IIHS.

2.2.2.1 Staff Turnover

Studies from management science, nursing, and other related fields provide strong evidence that “investments in human resources affect organizational

performance” (Wells, 2006, p. 1187). This is particularly relevant to the fields of child welfare and children’s mental health, given the difficulties in those fields in recruiting and retaining qualified staff (Government Accountability Office, 2003). Estimates of annual turnover within agencies providing mental health services have ranged from less than 20% (Schoenwald, Sheidow, Letourneau, & Liao, 2003) to more than 50% (Sheidow, Schoenwald, Wagner, Allred, & Burns, 2007), although it is unclear if these estimates represent staff leaving their position (possibly due to promotion within the agency), leaving the agency, or leaving the field of human services altogether.

Staff turnover may have a particularly negative impact in programs such as IIHS for two reasons. First, a single counselor is held accountable for service delivery and outcomes for each youth and family. Staff turnover often disrupts the relationship that a family has built with a counselor, which in turn may affect the likelihood of a positive outcome. A recent study of IIHS examined the impact of counselor stability (the number of counselors who provide service on a case) on one-year postdischarge outcomes and found that decreasing levels of counselor stability were associated with lower odds of a desirable outcome at one-year postdischarge (Greeson, Barth, Guo, Hurley, & Sisson, in press).

In addition to the potential impact on youth outcomes, a high level of staff turnover may require substantial expenditures by agencies for recruitment and training, leaving fewer dollars available for other resources that may assist staff in achieving positive outcomes for youth and their families. The lack of resources has been shown to affect caseworkers’ ability to do their jobs (Government Accountability Office, 2004). High levels of turnover may also affect an agency’s ability to maintain low caseloads, as cases are shifted between remaining caseworkers, who must carry additional cases while replacements are hired and trained. High caseloads tax the personal resources of caseworkers, limiting the time and energy available to devote to each client. Caseworkers have been shown to be more effective when they have smaller caseloads (Littell & Tajima, 2000). Studies from other health and human service settings confirm that smaller caseloads positively impact service delivery and client outcomes (Aiken, Clarke, & Sloane, 2002; Aiken, Clarke, Sloane, Sochalski, & Iber, 2002; Ghose, 2008).

2.2.2.2 Supervisory Support

Support from supervisors is another resource that has been demonstrated to have a significant impact on front-line workers and on youth outcomes. In a study of community-based agencies providing a family preservation program, supervisor support was one of a number of factors that was related to fewer out-of-home placements for youth (Yoo & Brooks, 2005). Consultative supervision, as opposed to supervision focused on monitoring of worker activities, has been positively associated with caseworkers’ views regarding their work (Rycraft, 1994). The role of supervision may be particularly important in IIHS programs, as a low supervisor-to-counselor ratio is a common structural feature of such programs (Henngeler & Schoenwald, 1998; Yoo & Brooks, 2005). Counselors may be affected by turnover among supervisors in much the same way that families are affected by turnover among counselors, as new supervisors may be less able to offer effective support and may be less able to establish supportive relationships with counselors, particularly if counselors have had multiple supervisors. This may, in turn, negatively affect the counselors’ work with youth and families.

Evidence from clinical trials of MST has demonstrated the crucial role of supervisors in securing positive long-term outcomes for youth. Supervisors in MST programs are the primary vehicle through which therapists learn the model and gain competence in implementing it with families. Therapist adherence to evidence-based practices has been linked with posttreatment outcomes within the context of MST (Huey, Henggeler, Brondino, & Pickrel, 2000). Therapist adherence has, in turn, been associated with the availability of expert consultation on the model (Schoenwald, Sheidow, & Letourneau, 2004). Organizational factors such as barriers to supervision and consultation, perceived fiscal instability, and limited supply of qualified staff have contributed to low levels of therapist adherence (Rowland et al., 2005).

Supervisors may also play a large part in creating a culture of learning for front-line staff. Investments in staff training resources have been demonstrated to be effective in improving services (Chaffin, Kelleher, Harber, & Harper, 1994; Gregoire, 1994; Latting et al., 2004), especially when coupled with supervisory support for new skill utilization and development (Clarke, 2002). Assuring that staff receive appropriate training is often the primary responsibility of the supervisor. Ineffective or inconsistent supervision may result in an interruption in the training process for staff, adversely affecting their ability to deliver quality services and achieve positive outcomes.

2.2.2.3 Collaboration with Other Agencies

Agencies that serve children and families in the child welfare and/or children's mental health systems are frequently obliged to collaborate with other organizations as their clients often present with multiple challenges that are under the purview of different agencies (Wells, 2006). Given the ecological basis for most IHS programs (Henggeler et al., 1986; Pecora et al., 1992), collaborative work with the multiple systems that affect a youth's behavior is an integral part of the delivery of this type of service. Evidence concerning the impact of collaboration on quality of service delivery and client outcomes has been somewhat mixed. Integration of agencies into a collaborative network was linked to higher levels of network effectiveness, evidenced by client satisfaction and functional status (Provan & Milward, 1998). Further work on the topic demonstrated that strong reciprocal ties among a small group of agencies resulted in better client outcomes than weaker ties across a broader range of providers within a network (Provan & Sebastian, 1998). Collaborative contacts with other agencies are often positive and rewarding experiences for caseworkers (Darlington, Feeney, & Rixon, 2004). Stronger collaborative efforts between agencies have also been associated with mental health service utilization that more closely matches service needs and with decreased racial disparities in service utilization (Hurlburt et al., 2004). An indirect examination of service integration revealed that participation in coordinated services was related to increased likelihood of family reunification (Marsh, Ryan, Choi, & Testa, 2006).

The creation of collaborative structures and processes has not always resulted in increased collaborative activity, as failure to realize the full potential of collaboration often relates to the manner in which such change is introduced into the organization (Horwath & Morrison, 2007). In somewhat more equivocal findings, a randomized trial of system of care coordination found that integration increased mental health service access and utilization, although these improvements did not translate into improved functional outcomes for youth ostensibly because the treatments that were delivered were not effective (Bickman, Noser, & Summerfelt, 1999). Glisson and Hemmelgarn (1998) found that service coordination between agencies was negatively associated with

service quality (comprehensiveness and continuity of care, availability and responsiveness of caseworker) and had no effect on youth outcomes.

2.2.2.4 Integration of Research on Organizational Factors

The relationships between organizational factors, service delivery, and outcomes for children and families are complex and only partially understood. As Campbell (2002) indicated, IIHS services are often embedded within a larger services system, making it difficult to tease out the impact of any particular program on the child or family. As demonstrated above, studies have found organizational factors that both positively and negatively impact service delivery and outcomes. What is clear is the critical need to include organizational-level variables in the search for factors that impact the long-term outcomes of IIHS.

2.2.3 Measurement Issues in Behavioral Health Services

Measurement of outcomes for youth following behavioral health treatment has typically focused on two areas. Behavioral indicators have often included school performance, involvement in juvenile delinquency, and level of aggressive/disruptive behavior. Placement stability indicators, on the other hand, have focused on preservation of the youth in the family home (as opposed to entry into state custody), and avoidance of out-of-home placements in settings such as juvenile detention or correctional facilities, residential treatment centers, and psychiatric hospitals. Standardized instruments such as the Child Behavior Checklist (CBCL; Achenbach, 1991) and companion Youth Self Report (YSR; Achenbach) and the Child and Adolescent Functional Assessment Scale (CAFAS; Hodges & Wong, 1996) have frequently been employed to assess youth behavior in family, school, and community settings (Brown et al., 1999; Foster, Stephens, Krivelyova, & Gamfi, 2006; Henggeler et al., 2003; Ogden & Halliday-Boykins, 2004; Schoenwald, Sheidow et al., 2003; Timmons-Mitchell, Benker, Kishna, & Mitchell, 2006). Primary data collected from schools (Rowland et al., 2005) or juvenile courts (Henggeler, Halliday-Boykins et al., 2006; Timmons-Mitchell et al.) have been used to evaluate youth behavior. Parental or youth self-report have also been an important source of data on behavioral indicators such as school attendance/completion, suspensions, and expulsions (Henggeler et al., 2003; Rowland et al.), and on delinquent behavior (Henggeler, Halliday-Boykins et al.). Data on placement stability are often gathered from parental self-report (Ogden & Halliday-Boykins), but have also been generated from administrative and/or claims data (Rowland et al.).

The ubiquitous nature of the measures mentioned above in the literature belies the controversy that still surrounds the definition of the effectiveness of services. Client satisfaction, functional level, and reported symptoms have all been used to indicate program effectiveness, yet there is still debate as to which factor is most important (or whether all are necessary) to demonstrate the impact of services (Farmer, 2000). Significant concerns exist over the use of out-of-home placement as a primary indicator of program failure. While many studies of family preservation programs define placement of the child out of the family home as the outcome of interest (see, for example, Bagdasaryan, 2005; Bath, Richey, & Haapala, 2006; de Kemp, Veerman, & ten Brink, 2003; Ogden & Halliday-Boykins, 2004; Pecora et al., 1992; Ryan & Schuerman, 2004; Yoo & Brooks, 2005), this practice is potentially problematic, as the

outcome can also be considered an intervention. This confluence of intervention and outcome introduces considerable confusion into the determination of program effectiveness (Bitonti, 2002). In addition, the lack of an out-of-home placement, an indicator of program success, assumes that placement would have most likely occurred in the absence of the program, but many studies lack any measure of placement risk either at intake or termination of services (Bitonti). Difficulties arise in studies that attempt to address this issue of risk, as accurately evaluating the risk of out-of-home placement has proven to be challenging, at best (Berry, 1991; Thleman & Dail, 1992; Schuerman, Rzepnicki, Littell, & Budde, 1992), given that many factors associated with out-of-home placement (e.g., parental history of substance abuse, legal involvement, suicide attempts, reports of abuse and/or neglect) are likely to be highly correlated (Tarren-Sweeney, 2008). It has even been suggested that it is not possible to reliably measure risk of out-of-home placement as there are myriad, sometimes hidden, factors that figure into the decision-making process (Rossi, 1992). Progress has been reported in constructing an index from existing instruments that predicts out-of-home placements at follow-up (de Kemp, Veerman, & ten Brink), but this measure requires substantial data collection efforts as it is based on multiple existing instruments.

Avoidance of out-of-home placement as a positive outcome also assumes that the youth will experience greater well-being and safety within the home rather than out of the home. A recent prospective, longitudinal study suggested, however, that for children who were at risk of removal from abusive or neglectful homes, the quality of life was higher for youth placed in out-of-home care than for those remaining with families (Davidson-Arad, 2005). Well-being is a notoriously difficult concept to measure (Davidson-Arad; Poertner, McDonald, & Murray, 2000; Wulczyn, Barth, Yuan, Harden, et al., 2005) and few studies have adequately addressed the relationship between permanency, well-being, and safety, the three primary goals of family preservation services. Measuring safety also presents significant challenges, as there is little agreement on how to define safety and at what points (during or after treatment/placement) it should be measured (Barth & Jonson-Reid, 2000).

Methodological concerns have also been raised about the body of family preservation studies (Davidson-Arad, 2005). Many studies suffer from a variety of shortcomings, including the lack of a control or comparison group, retrospective designs, single data collection points, and failure to obtain baseline measurements (Davidson-Arad). Some studies have failed to track placements outside of the program of interest and have not appropriately accounted for runaways, effectively undercounting negative outcomes (Blythe et al., 1994). Reliance on only one or a few data sources or methods has been cited as methodological critique of much of the child welfare literature (Corcoran, 2000; Mash & Wolfe, 1991; Wolfe & Wekerle, 1993). The use of case records has been criticized because the information is not standardized, pertains only to the particular agency that created the case record, and may be based on selective or biased reports (Corcoran; Mash & Wolfe). These methodological issues represent significant barriers to assessing the impact of family preservation programs on the safety, permanency, and well-being of youth.

2.3 Evidence-Based Intensive In-Home Services – The Case of Multi-Systemic Therapy

One of the most frequently cited ‘best practices’ models in children’s mental health is MST. Though not without critique (see section 2.4), reports from multiple

clinical trials (see, for example, Borduin et al., 1995; Borduin, Henggeler, Blaske, & Stein, 1990; Brown et al., 1999; Brunk, Henggeler, & Whelan, 1987; Ellis, Templin, Naar-King, Frey, & Cunningham, 2007; Henggeler et al., 1986; Henggeler et al., 1991; Henggeler, Melton, & Smith, 1992; Henggeler et al., 1993; Henggeler, Mihalic et al., 1998; Henggeler et al., 2003; Ogden & Hagen, 2006; Rowland et al., 2005; Schaeffer & Borduin, 2005; Timmons-Mitchell et al., 2006) and numerous additional studies (see, for example, Halliday-Boykins, Schoenwald, & Letourneau, 2005; Huey et al., 2000; Schoenwald et al., 2004; Schoenwald, Halliday-Boykins, & Henggeler, 2003; Schoenwald, Henggeler, Brondino, & Rowland, 2000; Schoenwald, Sheidow et al., 2003; Sheidow et al., 2007) have provided substantial evidence of both the efficacy and effectiveness of this treatment approach. Originally designed by researchers at the Medical University of South Carolina, this intensive in-home model utilizes an ecological approach in examining the key drivers of a youth's behaviors and in addressing all of the systems (self, family, school, peers, and community) that impact the youth. Individualized to meet the needs of each youth, this model uses family strengths as powerful levers for changing disruptive and anti-social behaviors.

In the MST model, therapists employ an analytic process through which they engage families in gathering information, designing interventions, measuring outcomes, and adjusting program activities on a weekly basis (Henggeler, Schoenwald, Borduin, Rowland, & Cunningham, 1998). The length of services averages four to six months and the level of service is highly intense. Therapists meet with the youth and family in their home, the youth's school, and in other community settings at least three times per week, and are on call 24 hours a day, seven days a week, responding to families with phone or face-to-face support as needed. In addition to addressing basic needs including housing, food, transportation, and employment, therapists assist families in dealing with issues such as parental mental illness, substance abuse, and domestic violence and with building the parenting skills necessary to provide appropriate monitoring, supervision, and support to their children. The goal is to assist families in building a natural, sustainable support system that will enable them to maintain positive behavioral changes long after program discharge.

Therapists operate within a highly structured training, supervision and consultation model (Henggeler, Schoenwald et al., 1998). Therapeutic skills are developed through an initial five-day training, quarterly one and a half day booster trainings, weekly team and individual supervision sessions, and weekly case consultations with an expert in the MST model. Case loads are low, with each therapist responsible for four or five families; supervisor-to-therapist ratios are also low at approximately 1:4. As model fidelity has been demonstrated to affect long-term youth outcomes, MST emphasizes the measurement of adherence to the program principles as well as to the structure and content of training, supervision, and consultation.

Within the context of the MST clinical trials, research has evolved from examining differences between treatment and comparison groups to more advanced hierarchical and structural models, focusing on factors related to treatment success. The analytical approach of much of the early research on MST was typical of experimental design: examination of subject characteristics established the comparability of treatment groups and factorial designs were employed to detect differences between groups and across time (usually pre-post). Covariates were employed primarily to control for baseline measures of functioning (Brown et al., 1999; Henggeler et al., 1991; Henggeler et al., 1986; Henggeler, Rowland et al., 2003; Mann, Borduin, Henggeler, & Blaske, 1990;

Schoenwald, Ward et al., 2000). Additional studies included analysis of mediating and/or moderating variables (usually youth or therapist demographic characteristics) to determine whether the treatment was equally effective with all youth and to examine factors that might have influenced the observed outcomes (Borduin et al., 1995; Henggeler, Melton, & Smith, 1992; Ogden & Halliday-Boykins, 2004). More recent studies have employed sophisticated hierarchical and structural models to account for the nested nature of the data (youth within therapists, therapists within organizations) and to assess the contribution of various factors to observed outcomes (Halliday-Boykins et al., 2005; Schoenwald, Halliday-Boykins et al., 2003; Schoenwald, Sheidow et al., 2003). Although this body of literature has provided a foundation for understanding the mechanisms of change within MST, there are significant criticisms of this work, as well as gaps in the understanding of the relative importance of various factors that have been demonstrated to affect long-term outcomes for youth receiving these services.

2.3.1 Child and Family Characteristics

A variety of child and family characteristics have been examined for their effect on the long-term response to IHS services and can be grouped into four categories: demographics, administrative attributes, risk factors, and pre-treatment functional assessment scores. A number of studies in the MST literature found that demographic characteristics of the child and/or family played no role in predicting or mediating long-term outcomes (Borduin et al., 1995; Henggeler et al., 1992; Schaffer & Borduin, 2005), although a few studies suggested a limited role for certain demographic characteristics of the youth/family (Ogden & Hagen, 2006). Parental education, income, and ethnic match with therapist were all found to be directly related to therapist adherence (Schoenwald, Sheidow et al., 2003). Ethnic match between therapist and caregiver (parent or guardian) was also demonstrated to predict symptom improvement (as measured on the CBCL), retention in treatment, and successful discharge (Halliday-Boykins et al., 2005). At least one study found that youth gender had a moderating effect on placement out of the home (Ogden & Hagen, 2006), as MST was more effective in keeping boys in their homes, while there was no difference in placement rates between groups for girls. This finding should be viewed with caution due to the small number of female participants in this particular study ($n = 27$). Additionally, increasing age of the youth was shown to be a significant predictor of juvenile delinquency at one-year postdischarge among youth receiving IHS services (Barth et al., 2007a). Earlier studies on intensive family preservation programs that employed an in-home service delivery model suggested that family income was a significant predictor of post-treatment functional status, with children from lower-income households faring worse than their middle- and higher-income counterparts (Eamon, 1994; Eamon & Kopels, 2004; MacLeod & Nelson, 2000).

Administrative attributes that have been examined include referral source, funding source, and custody status. Most of the MST literature is based on grant-funded clinical trials with strictly defined eligibility criteria (Borduin et al., 1990; Brunk, Henggeler, & Whelan, 1987; Henggeler et al., 1986; Henggeler et al., 1991). In the studies with multiple referral or funding sources, the role of referral source was usually only examined to establish the comparability of treatment groups rather than to determine the impact that it may have had on long-term outcomes such as placement stability, educational progress, and contact with legal authorities (Henggeler, Pickrel, & Brondino,

1999; Schoenwald, Sheidow et al., 2003;). While published MST studies have not to date included youth in state child welfare custody, significant research has pointed to the generally poor outcomes experienced by these youth, specifically youth who remained in state custody until age 18 (Goerge et al., 2002; Pecora et al., 1992).

A number of factors have been identified as putting children at risk for the types of negative outcomes that IIHS services are designed to prevent, specifically for out-of-home placement, contact with legal authorities, and school failure. These risk factors include the child's previous mental health status, prior involvement with delinquency, substance abuse, and/or negative peers (peers involved with substance abuse and/or delinquency), and duration, type, and intensity of previous out-of-home placements and mental health treatments. As MST's original focus was on serious and chronic juvenile offenders, risk factors relating to previous involvement in delinquency have frequently been examined relative to establishing comparability of treatment groups, and have also been used as a covariate to control for observed group differences in past delinquency (Henggeler et al., 1991; Henggeler et al., 1992; Mann et al., 1990). More recent research has highlighted the importance of some types of previous mental health treatment in predicting long-term outcomes following IIHS (Barth et al., 2007a).

Variation in child and family functional level must be statistically controlled in order to accurately describe the impact of therapeutic interventions. Several instruments, including the CBCL and YSR (Achenbach, 1991), Self-Report Delinquency Scale (Elliott & Ageton, 1980), Family Adaptability and Cohesion Evaluation Scale (Olson, Portner, & Lavee, 1985), Family Assessment Measure: General Scale (Skinner & Steinhauer, 1993) and CAFAS (Hodges & Wong, 1996) have been used to examine child and family functioning. While each instrument measures slightly different constructs, most produce an assessment of whether a child has clinically significant behavioral health impairments. Pre-treatment assessment scores have sometimes been used in the MST literature both to examine the comparability of treatment groups (Borduin et al., 1995; Henggeler, Halliday-Boykins et al., 2006; Henggeler et al., 1999; Rowland et al., 2005) and as covariates to control for observed group differences (Henggeler et al., 1991; Henggeler et al., 1992; Henggeler, Schoenwald et al., 1998; Ogden & Hagen, 2006). Recent analysis of data from Youth Villages (YV) suggested that pre-treatment assessment scores from standardized instruments were not significantly related to post-treatment behavioral indicators (Barth et al., 2007a).

2.3.2 Therapist Characteristics

Because the therapist is the primary vehicle through which MST services are delivered, therapist characteristics have been examined to determine their impact on long-term outcomes for children. Demographic characteristics (age, race, gender) as well as therapist education and experience are often provided in published reports of MST studies as part of the description of treatment conditions, but the impact of these attributes on either therapist adherence to the MST principles or on post-treatment behavioral indicators has not been examined (see, for example, Borduin et al., 1995; Halliday-Boykins et al., 2005; Schoenwald et al., 2004; Schoenwald, Sheidow et al., 2003; Schoenwald, Ward et al., 2000). The ethnic match between therapist and primary caregiver has been shown to exert influence on caregiver assessments of therapist adherence and post-treatment functional outcomes (Halliday-Boykins, Schoenwald, & Letourneau, 2005).

The degree to which therapists adhere to the MST model has been extensively studied, as therapist adherence has been shown to significantly impact post-treatment outcomes (Henggeler, Melton, Brondino, Scherer, & Hanley, 1997; Schoenwald, Ward et al., 2000). A 26-item instrument was developed to measure adherence to MST principles, capturing several different dimensions of adherence including engagement with family, therapist attempts to change family interactions, adherence to MST principles, and non-productive sessions (Henggeler et al., 1997; Henggeler, et al., 1999;). The Therapist Adherence Measure (TAM) was subsequently reconfigured into a single adherence score based on 15 items (Schoenwald, Sheidow et al., 2003). High levels of therapist adherence were linked in both direct and indirect ways to family functioning, delinquent peer affiliation, and delinquent behavior (Huey et al., 2000). Therapist adherence has also been shown to have a moderating effect on the relationship between organizational climate (specifically Job Satisfaction and Opportunity for Reward and Advancement) and successful discharge of youth from the program (Schoenwald, Sheidow et al., 2003).

2.3.3 Organizational Characteristics

In a study of the transportability of the MST model to community-based agencies, the impact of organizational climate and structure was assessed (Schoenwald, Sheidow et al., 2003). Two dimensions of organizational climate (Energized and Effective, Opportunity for Advancement & Reward) were directly related to child outcomes. The Energized and Effective component marginally predicted lower problem levels, while Opportunities for Advancement & Reward predicted more behavior problems at posttreatment and predicted lower levels of successful treatment completion. The last dimension did not behave in the expected direction. In general, therapist adherence was shown to moderate the relationships between organizational climate, organizational structure, and youth outcomes immediately following treatment, which partially explained the unexpected finding earlier: when therapist adherence was high, outcomes are positive regardless of the Opportunities for Advancement & Reward, but when therapist adherence is low, such opportunities predict greater behavior problems in youth at posttreatment. Three of the five dimensions of organizational climate (Opportunity for Advancement & Reward, Energized and Effective, Job Satisfaction) were found to impact post-treatment youth outcomes as well as treatment completion. Dimensions of organizational structure such as size and dimensions of organizational functioning such as leadership stability and staff turnover have been shown to impact the delivery of mental health services (Bruns, Suter, & Leverentz-Brady, 2006). An examination of these characteristics in the context of the implementation of MST has not yet appeared in the scholarly literature.

2.4 Critique of Evidence-Based Intensive In-Home Services

While a great deal of literature strongly supports the efficacy and effectiveness of MST, it is important to note that there are also a number of serious criticisms that have been raised concerning both the MST literature as well as the larger body of evidence on IHS. The most well-known critique of the literature on the efficacy and effectiveness of MST came from a systematic review using Cochrane principles (Littell, Popa, & Forsythe, 2007) and from an earlier article describing the review process (Littell, 2005). Littell's

critique of the extant MST literature centered largely on two issues: the use of 'treatment of the treated' analysis rather than 'intent to treat' analysis and the inconsistent reporting of study sample and design parameters. The 2005 article also took many of the 'best practices' lists and published research reviews to task for their uncritical acceptance of MST's published research reports. In an analysis of the published research reviews, Littell (2008) suggested that reviews may suffer from confirmatory bias, often accentuating positive findings and ignoring those that are more equivocal. While the MST developers vigorously defended their work and questioned many of Littell's assumptions and methods in the systematic review (Henggeler, Schoenwald, Borduin, & Swenson, 2006), some of the issues that were raised during this debate persist (Littell, 2006, 2008). Additionally, concern has also been voiced regarding the lack of attention to covariates that could potentially account for a substantial portion of the variance in outcomes (Barth et al., 2007b). Although covariates have commonly been used in the MST literature to control for group differences in pre-treatment assessment scores, few MST studies have used covariates to correct for a potential lack of independence between outcomes and treatment conditions, as recommended by some researchers in the field (Imbens, 2004; Shadish, Cook, & Campbell, 2002). Another area of concern in the MST literature is the measurement of model fidelity, as this has been shown to have a significant, though indirect, role in reducing delinquent behavior (Huey et al., 2000). In a discussion of the relationship between therapist adherence and instrumental (intermediate) and ultimate youth outcomes, the MST developers identified that the current measure, while appearing to adequately assess therapist adherence, has not been determined to differentiate adherence to MST principles from adherence to similar IHS programs (Schoenwald, Henggeler, Brondino, & Rowland, 2000). To date, this issue has not yet been resolved, partly due to the lack of availability of similar (non-MST) IHS programs.

Aside from Littell's (2005, 2006, 2008) critiques, methodological challenges still exist for those attempting to accurately describe the impact of this model. The literature to date has included relatively few controls on covariates, even in situations where groups were known to be nonequivalent (Barth et al., 2007b). While detailed descriptions of the program are available (Brunk et al., 1987; Henggeler et al., 1986; Henggeler et al., 1991), scant attention has been paid to measurement of various program components and to how those activities might affect outcomes. Attempts have been made to address mechanisms of change (Huey et al., 2000; Mann et al., 1990), but knowledge in this area is still incomplete at best. Finally, much work has been done on the issue of therapist adherence, yet a measure that differentiates MST from other therapeutic interventions has not been developed. Such further specification of the model will be helpful in establishing the effect of the model across subpopulations and implementation sites.

Broader concerns have been raised about a wide variety of family preservation interventions. Without amelioration of the underlying social conditions that create much of the child and adolescent behavior that is defined as dysfunctional (e.g., aggression, juvenile delinquency, failure to graduate high school, substance abuse, teen pregnancy), the effectiveness of any program is questionable (Corcoran, 2000; Eamon, 1994; Eamon & Kopels, 2004; MacLeod & Nelson, 2000; Tarnowski & Rohrbeck, 1993). Family preservation services most commonly are delivered through the child welfare system, which may not be well-equipped to provide the kinds of assistance needed by parents including substance abuse treatment, housing assistance, and mental health treatment (Littell & Schuerman, 2002). Factors such as extreme poverty, single-parent status, low

educational attainment, and mental illness may interact, yielding families unlikely to benefit from time-limited programs that fail to address the underlying issues (Dore, 1993). The provision of child welfare services alone has been demonstrated to be insufficient to achieve family reunification in the presence of co-occurring challenges such as parental substance abuse (Marsh et al., 2006). Indeed, in reviewing the Annie E. Casey Foundation's proposals for reforming New York City's child welfare system, Epstein (2003) argued that there was virtually no credible empirical evidence of the actual effectiveness of any intervention designed to prevent out-of-home placements.

2.5 Factors Influencing Long-Term Outcomes Following Intensive In-Home Services

This study is part of a larger research agenda aimed at creating a predictive algorithm that statistically links youth characteristics, program activities, and long-term youth outcomes. The desired deliverable from this agenda is a defined set of program activities (treatment setting, length of service, intensity and type of service) most likely to produce positive long-term outcomes for youth with identified risk and referral characteristics, to be used as a guide for creating an individualized array of treatment services for each child and family. Significant work has been completed toward this end and is described below. The present study represents a crucial step in the process, enabling the accurate identification of the essential youth and family characteristics, program activities, and organizational attributes that will facilitate the creation of a predictive algorithm.

2.5.1 Youth Characteristics

The first step in this research agenda involved identification of youth demographic characteristics, risk level, and behavioral/functional assessment scores that were associated with positive long-term outcomes, including placement stability, educational progress, and contact with legal authorities. Youth characteristics and risk factors were found to predict outcomes at one-year postdischarge from an IIHS program, with psychometric measures administered at intake contributing only moderately to predictive value (Barth et al., 2007a). Each outcome was predicted by a different set of child characteristics and risk factors. A strong positive association between age and contact with legal authorities was found, while the presence of risk factors such as previous maltreatment and mental health treatment in restrictive settings were associated with a greater likelihood of future out-of-home placements.

2.5.2 Use of Propensity Score Matching to Create Comparison Groups

Because the use of randomized controlled trials in community-based settings is difficult, at best, statistical techniques were explored to create equivalent groups for purposes of comparing the long-term outcomes (placement stability, educational progress, contact with legal authorities at one-year postdischarge) associated with various treatment activities (Barth et al., 2007b). Two initial samples of youth were selected from YV clients: those who had received only IIHS and those who had received only residential treatment. Using predictive modeling, youth were described in terms of their propensity to receive IIHS (versus residential treatment), based on demographic, referral, and risk factors. Propensity score matching was then used to construct

equivalent groups: a single “nearest-neighbor match” for each youth receiving IIHS was selected from the residential treatment group, based on similar propensity scores. Outcomes for the two re-sampled groups were then compared to determine the impact of treatment type on long-term outcomes. IIHS provided a marginally higher probability of positive outcomes at one-year postdischarge than residential treatment. Given the lower level of restrictiveness and lower cost of IIHS, this study suggested that IIHS should be explored prior to residential treatment for behavioral disorders.

2.5.3 Counselor Characteristics

As a third step in the process, the contribution of counselor characteristics and counselor stability to long-term outcomes was explored. The research found that counselor gender was significantly associated with long-term outcomes; clients of female counselors were more likely to achieve positive outcomes at one-year postdischarge. Counselor stability, defined as the percent of sessions completed by the primary counselor, was also associated with long-term outcomes, though not in the expected direction: increases in counselor stability were actually associated with increases in the probability of an undesirable outcome at one-year postdischarge. Further exploration revealed that this relationship was moderated by counselor gender: for female counselors, greater stability was associated with increased likelihood of desirable outcomes at one-year postdischarge, while the opposite was true for male counselors. Counselor education was also shown to impact counselor stability, with Master’s level counselors associated with higher levels of stability than Bachelor’s level staff (Greeson et al., in press).

2.6 Gaps Addressed by the Current Study

While efforts prior to this study have provided important information regarding factors influencing long-term outcomes for youth following IIHS, an integration of these findings was crucial. The next logical step was to conduct a multivariate, multilevel analysis that simultaneously examined the impact of youth, family, program, and organizational characteristics on placement stability, educational progress, and contact with legal authorities at one-year postdischarge. Although multilevel modeling had previously been applied to research questions in the fields of child welfare and children’s mental health (Ryan & Schuerman, 2004; Schoenwald, Sheidow et al., 2003; Yoo & Brooks, 2005), the application of this tool to data from a community-based agency (as opposed to university-based clinical trials) was unique.

Gaps in the current understanding of the impact of IIHS can be summed up thusly: what is the relationship between client/family characteristics, program activities, organizational characteristics, and long-term outcomes? To paraphrase Bagdasaryan (2005), for whom do these programs work, under what circumstances, and for what types of outcomes? Evidence concerning the manner in which organizational factors such as functioning, structure, and management affect outcomes has been particularly scant, especially in the fields of child welfare and children’s mental health (Wells, 2006). Although some excellent work has been conducted on these questions (Bath & Haapala, 1993), it is likely that a more complete understanding will be generated through the use of sophisticated statistical techniques that allow the thorough dissection of important relationships. Increasingly, researchers have applied tools such as multilevel modeling

(Ryan & Schuerman, 2004; Yoo & Brooks, 2005), propensity score matching (Barth et al., 2007b), and event history analysis (Kirk & Griffith, 2004; Unrau & Coleman, 2006), heretofore underutilized in the child welfare arena, to increase their understanding of the predictors and correlates of outcomes in child welfare and children's mental health. Much work remains to be done to discover what needs to be known in order to create more effective services that improve the lives of children and families.

In making decisions regarding resource allocation for program improvement, it is essential that community-based agencies clearly understand the relative importance of program activities in relation to that of youth risk factors, and how those compare with organizational attributes. Program improvement interventions will be quite different if the impact of organizational characteristics far outweigh those of youth referral and risk factors, rather than the other way around. This study has the potential to provide critical information to guide decisions regarding the program improvement interventions most likely to impact long-term youth outcomes. By utilizing data from a large community-based agency, this study has the opportunity to provide 'real world' effectiveness information that may be more easily translated to other community providers who face similar populations and treatment situations.

CHAPTER 3: METHODS

3.1 Study Overview

This study investigated the relative impact of youth and family characteristics, program activities, and organizational attributes on outcomes at one-year postdischarge following intensive in-home services (IIHS). Due to the nested nature of the data (e.g. youth nested within offices), multilevel modeling was employed to examine the relative impact of each level (youth, office) on one-year postdischarge outcomes. Data from Youth Villages (YV) was utilized; information was available for all youth who received IIHS and who were discharged between January 1, 2001 and December 31, 2006. Youth and family characteristics, program activities, organizational attributes, and long-term youth outcomes were compiled from the agency's electronic records systems.

3.2 Study Sample

The study sample was drawn from the client population of YV. All youth who received IIHS as their only service from the agency, were discharged between January 1, 2001 and December 31, 2006, and who completed a follow-up survey one year after discharge were included. Additional inclusion/exclusion criteria, described below (see Section 3.2.2), further defined the study sample.

3.2.1 Nested Data Structure

As the primary concern in this data analysis was with the simultaneous impact of youth, family, program, and organizational characteristics, appropriate handling of the nested structure of the data was imperative. Given the structure of the IIHS program, in which a single counselor is responsible for providing services to a family for the duration of their enrollment in the program, a three-level structure was initially assumed with youth nested within counselors who were nested within offices. Close inspection of the data revealed that youth are often served by multiple counselors (only 22.2% of youth had just one counselor). Youth were clearly nested within offices; with only one office per city, it was rare to find a youth served in two different offices, which would have indicated that the family moved during services. Although this scenario had occurred at the agency, no cases were found in the present sample that indicated youth were served in multiple locations. Based on this information, a two-level model was adopted to accommodate the structure of the data.

Level 1 contained youth-level data, which included information on the youths' family characteristics as well. Due to limitations of most funding sources in the IIHS program, it was highly unusual to serve, as the identified client, multiple youth from the same family. In the limited instances in which this occurred, only the first child served from a family was included in the analysis (only 1.1% of youth had a sibling who was also served in the IIHS Program). This procedure eliminated the need to account for nesting within families, as each family was represented only once in the data. Program activities (duration, frequency, and intensity of service) were also assessed at the youth level.

Level 2 contained the office-level characteristics of size and staff turnover. While virtually all services are delivered by counselors in youths' homes, schools, or other community locations, the office setting is important because it is the site of supervision, consultation, and training activities. IIHS was provided during the study period in 23 offices across five states and the District of Columbia. Three of those offices had been in operation for less than two years and had discharged 25 cases or less during the study period. Due to the small number of discharged cases relative to other offices, the three new offices were not included in the analysis.

3.2.2 Inclusion/Exclusion Criteria

All youth who were discharged between January 1, 2001 and December 31, 2006, received at least 30 days of IIHS, did not receive any other YV service, and completed a 12-month follow-up survey were included in the sample. Youth who were enrolled in services but never actually received any services (no sessions were conducted and no collateral services were provided) were excluded from the study sample. As mentioned above in section 3.2.1, youth who had siblings who previously received IIHS services were excluded, as were youth served by the three offices most recently opened by the agency.

3.3 Data Sources

Since September 2000, YV has maintained an electronic medical record (EMR) system using Echo Management Group's Clinician's Desktop application (CDT). Utilizing a Microsoft SQL Server relational database backend, CDT is a fully customizable web-enabled EMR that provides real-time data to clinicians, program and leadership staff, and researchers throughout all YV programs (residential treatment, group homes, foster care, IIHS, mobile crisis services, transitional living services) and at all YV locations. The system is fully HIPAA-compliant, features role-based access both for groups and individuals, and includes a full-scale training environment that allows on-the-job training for clinicians using copies of live data. The quality of the data is monitored through several collaborative processes in the Research, Placement, and Performance Improvement Departments of the agency. Accuracy of program participation data is checked/corrected weekly and key data fields (demographics, discharge type/location) are continually examined for missing data.

All youth-level data were drawn from the agency's EMR system. In addition to demographic information, data were gathered from the system concerning program enrollment (e.g., enrollment start and end dates, location), clinical assessments, and treatment activities (family sessions and collateral contacts made on behalf of the youth and/or family). All postdischarge follow-up data was also retrieved from the EMR. Although follow-ups were conducted with youth and families at six, 12, and 24 months postdischarge, only one-year follow-up data will be used for this study for three reasons. First, outcomes at 12 months are commonly used in the MST literature (Henggeler et al., 2003; Henggeler, Halliday-Boykins et al., 2006; Henggeler et al., 1992; Sheidow et al., 2004). Second, selecting a single follow-up significantly simplified the statistical analysis and the likelihood of estimation success. Finally, the 24-month follow-up data had not yet been collected from the entire sample (youth discharged in December 2006 will have a 24-month survey in December 2008). In addition, the 24-month follow-up data

collected thus far were less complete, limiting the number of observations available for analysis, which would, in turn, reduce the power available to detect differences between groups.

The Human Resources Department of the agency provided data on the hire date and termination date of all counselors who provided services in the IIHS Program during the study period. As discussed in further detail in section 3.4.2, these data were used to calculate the monthly turnover rate in each office. Finally, one organization-level variable was calculated from the EMR: a measure of organization size (number of youth served in each office during the study period).

3.4 Measures

Prior research in this and other areas of behavioral health treatment have identified a multitude of factors at a variety of levels that potentially impact long-term outcomes such as those under investigation in this study. Measures discussed in this section are limited to those that were examined as potential predictors to be included in the models and those used in the calculation of a response bias correction factor. Table 1 provides a list of variables that were employed as predictive factors, as well as their expected relationship with the identified outcomes.

3.4.1 Youth-Level Measures

3.4.1.1 Demographics

Youth demographic characteristics captured from the EMR included age (in years) at the time of admission, gender (male/female), and race (African-American, non-African-American), with gender and race represented by dummy variables in the models.

3.4.1.2 Clinical Characteristics

Data concerning risk factors such as previous involvement in juvenile delinquency, runaway behavior, substance use/abuse, and association with negative peers were gathered during the extensive Psychosocial Assessment (see Appendix A) conducted by YV counselors at entry into the program. The assessment included data on each family member and their history of psychiatric illness, substance abuse, contact with legal authorities, and domestic violence, as well as information on family income.

Measures derived from the Psychosocial Assessment included youth-level indicators for behavioral disorders, emotional disorders, suicide ideations or gestures, previous involvement with juvenile justice authorities, substance abuse, runaway, association with negative peers, difficulty making/maintaining friendships, victim of neglect, victim of physical abuse, victim of sexual abuse, sexual activity, and whether the youth received special education services or resource classes. Family characteristics gleaned from the assessment included indicator variables for spiritual affiliation, weapons in the home, income (low income, not low income), parental involvement in school, presence of grandparents in the home, and presence of biological parents in the home. A count variable was created to indicate a family history of any of the following issues: substance abuse, mental illness, legal involvement, or domestic violence.

Table 1. Independent and Dependent Variables

Variables	Expected Relationship with Probability of Positive Outcome at One-Year Postdischarge
Independent Variables	
Level 1: Youth Variables	
Age	negative
Gender	not significant
Race/Ethnicity	not significant
Antisocial Behaviors	negative
Emotional Difficulties	negative
Victim of Abuse and/or Neglect	negative
Contact with Juvenile Authorities	negative
Runaway	negative
Substance Use/Abuse	negative
Negative Peers	negative
Presence of Family Risk Factors (mental illness, substance abuse, domestic violence, legal involvement)	negative
Length of Service in Program	positive
Had Primary Counselor	positive
Level 2: Organizational Variables	
Counselor Turnover Rate	negative
Office Size	positive
Dependent Variables	
Placement at One-Year Postdischarge (living with family vs. not living with family)	N/A
Educational Progress at One-Year Postdischarge (in school or GED classes/completed school vs. not)	N/A
Contact with Juvenile Authorities at One-Year Postdischarge (any contact in the past six months)	N/A
Out-of-Home Placement at One-Year Postdischarge (any placement in the past six months in a residential treatment center, psychiatric hospital, or juvenile detention or correctional facility)	N/A
Composite Outcome (combines previous four outcomes into a single measure)	N/A

3.4.1.3 Characteristics of Program Participation

Data concerning participation in program activities involved several indicators. Year of discharge was recorded and entered into analyses as a set of five dummy variables, with 2006 as the reference year. Length of service was recorded as number of days between admission and discharge. This variable was substantially skewed (Skewness statistic = 2.314, s.e. = .048); length of service was log transformed to bring the values closer to a normal distribution (Skewness statistics = .310, s.e. = .048). The total number of family sessions was recorded, as was the number of collateral contacts, that is, contacts made on behalf of the family with others involved with the youth, including schools, courts, relatives, churches, and other social service agencies. Intensity of services was determined by the average number of contacts (including both family sessions and collateral contacts) per week. Total staff time on the case was based on the combined length (in minutes) of all sessions.

Case disposition at discharge (placement with family or not with family) was gathered. Youth who were on runaway at the time of discharge were considered to be not placed with family. Data were also gathered on the funding source for services (Medicaid/not Medicaid). Finally, youth were categorized as having a primary counselor if an individual counselor conducted 75% or more of the family sessions, otherwise the indicator reflected no primary counselor on the case.

3.4.1.4 Long-Term Outcomes

During the study period, data were gathered from youth (if over 15 at the time of the follow-up), families, or custodial agency staff (if the custodial agency was involved with the youth during treatment) by the YV Research Department via phone Follow-up Survey (see Appendix B). This tool was developed by the agency and focused on simple behavioral and functional indicators: placement at the time of follow-up, educational progress, contact with legal authorities, and out-of-home placements. Rationale for defining long-term outcomes based on status at the one-year postdischarge follow-up was provided in section 3.3.

Placement at time of follow-up was categorized as 'placement with family', which included not only living with family (biological or adoptive), but also living independently (either alone or with friend, non-relative, or spouse), living in a school or training program dorm, participation in a job corps program, or being on active military status. 'Not living with family' included all restrictive treatment or correctional settings such as psychiatric hospitals, residential treatment centers, juvenile detention or corrections, adult jail, group homes, diagnostic centers, drug and alcohol rehabilitation facilities, therapeutic foster care and half-way houses. Youth who were on runaway at the time of follow-up were classified as 'not living with family'. Educational progress was defined as being in school (primary, secondary, or post-secondary), graduated from high school (diploma or GED), or in GED classes at the time of follow-up. Contact with legal authorities was defined as any reported contact with law enforcement authorities during the six months preceding follow-up, including juvenile authorities, regardless of whether or not the contact resulted in legal action or placement in custody. Out-of-home placement was defined as placement at any time during the six months preceding follow-up in any restrictive mental health, psychiatric, juvenile justice, or correctional facility.

In addition to the behavioral and functional indicators of long-term outcome listed above, a composite categorical measure was created. Following the procedure used by Barth et al. (2007a, 2007b), outcomes were classified as *desirable* if youth were living with family at the time of follow-up, making education progress, had avoided contact with legal authorities, and had not been placed out of their home during the follow-up period. *Mixed* outcomes were defined as living with family at the time of follow-up, but experiencing at least one of the following conditions: lack of educational progress, contact with legal authorities, or out-of-home placement. *Undesirable* outcome was defined as not living with family at the time of follow-up, regardless of the status of other behavioral indicators.

3.4.2 Organizational Characteristics

Staff turnover has historically been a significant issue in human service agencies; estimates of 50% to 70% annual turnover are common (Larson & Lakin, 1999; Strouse, Carroll-Hernandez, Sherman, & Sheldon, 2003), although turnover within some MST programs involved in clinical trials has been demonstrated to be much lower, with only 20% annual turnover (Sheidow et al., 2007). This issue has been of concern at YV as well, with annual turnover during the study period estimated to be 58%. Turnover in the IIHS program tends to be highest during the period of four to six months after hire. Given that the average caseload for IIHS counselors is four families and average length of service in the program is four to six months, substantial turnover severely impairs the agency's ability to develop seasoned counselors.

For the purposes of this study, monthly turnover was calculated as the number counselors who left YV each month divided by the number of active counselors in the middle of the month (U.S. Department of Labor, 2008). An average monthly turnover was derived for each office by calculating the mean monthly turnover across the study period (1/01/01 to 12/31/06). This addresses only that portion of turnover resulting in separation of counselors from the agency and did not take into account promotions or lateral job transfers to other programs within the agency. Although skewness was not a concern with this variable (skewness statistic = .939, s.e. = .512), preliminary testing of the multilevel model indicated a need for transformation in order to obtain a convergent model, thus, mean monthly turnover was log-transformed.

Finally, size of office was measured as the number of youth served by each office in the IIHS Program during the study period. Agency policy regarding caseload was consistent across the study period (counselors carried four to six cases, teams consisted of four to five counselors), thus, this measure was taken to provide an indication of the cumulative experience an office had in serving cases. While number of staff in the office was another option available in measuring size, the variable level of turnover in offices made this a less attractive choice. Number of staff positions, that is, the number of staff employed at any given time, varied within offices across the study period, limiting the usefulness of staff positions as a measure of size. Number of cases was log-transformed prior to entry into the multilevel models, as skewness was a concern (skewness statistic prior to transformation = 1.257, s.e. = .512; after transformation = .347, s.e. = .512).

3.5 Analytic Approach

The non-experimental nature of the study demanded close attention to the issue of response bias. In addition, substantial preliminary work was required to detect and reduce collinearity among independent variables. Due to the nested nature of the data and the unequal size of groups (number of youth per office), hierarchical linear modeling was the most appropriate tool to examine the relative contribution of variables at each level to the identified outcomes.

3.5.1 Preliminary and Diagnostic Procedures

Substantial analyses were conducted to assure that the data were as free from bias as possible and that each variable represented a single, known construct. The non-experimental nature of the data, particularly the use of a phone survey to gather outcome data, required careful examination of the data for potential response bias that would limit the generalizability of findings to the population of interest. In addition, there was strong suspicion that many of the potential predictors were correlated, based on the conceptual framework that describes these variables as interconnected. Thus, several data reduction techniques were employed to reduce multicollinearity among the predictors and enhance the potential for model convergence.

3.5.3.1 Response Bias

Diagnostic procedures examined the data for bias that may have occurred as a result of non-random response patterns in the outcome variables. As all youth in the sample had been discharged for at least one year at the time of data collection, the concern centered on response bias, rather than data censoring; in this study, the opportunity existed to observe outcomes for all youth. Data on outcomes were gathered from phone surveys of youth, families, and/or custodial agency workers. The response rate was 60% in the combined sample, thus, although all youth had passed the one-year postdischarge mark, outcomes were not observed for all youth due to failure to respond to the phone survey.

Heckman and Smith (1995) eloquently described the fundamental problem of selection bias that arises in the evaluation of social programs. In order to accurately determine the impact of an intervention, it is necessary to observe what happens to subjects both with and without the intervention. The problem is that researchers cannot ever actually do that, as once an intervention is introduced, the opportunity to observe what would have happened in its absence is lost. Likewise, observing those in a control group (with no intervention) is necessary, but it precludes the measurement of outcomes in the presence of the intervention for these subjects. Thus, the problem can essentially be recast as a 'missing data' issue (Guo, Barth, & Gibbons, 2006), in that the data on outcomes in the absence of the intervention is missing for the treatment group. Randomized clinical trials provide a work-around for this problem, allowing researchers to substitute the outcomes from the control group for the outcomes that would have been observed had the treatment group not been treated. Central to the acceptance of the appropriateness of this strategy is the absolute equivalence, on all variables of relevance, of the experimental and control groups. In evaluations of social programs, however, it is unlikely that this criterion will be met – true randomized trials are rare in such situations, while quasi-experimental or non-experimental studies are much more common. Even in the most well-designed experiments, however, selection bias may operate in various

ways to influence which persons apply for acceptance into programs, which persons are actually accepted, and which persons remain in the program until completion (Heckman & Smith, 1995; Guo et al.). Since randomization will likely address no more than one of these stages, selection bias is a significant issue, even for studies that include appropriate allocation techniques. For quasi-experimental designs, selection bias represents a particularly difficult challenge, as groups are known to be nonequivalent on characteristics likely to affect the outcome.

Heckman's (1979) solution to this problem was to estimate the probability of group membership, substituting the probability for a dummy variable indicating group membership. This two-step procedure allowed for the use of "simple regression techniques to estimate behavioral functions free of selection bias" (p. 160). Work by Rosenbaum and Rubin (1983) conducted separately from Heckman's analysis extended this concept by specifying a series of steps that could be employed to identify the appropriate variables for use in creation of a probability score, accomplish the recreation of an appropriate control group, and re-analyze the data to detect outcome differences between the groups (Guo et al., 2006). The point of this exercise was to make assignment to treatment group "ignorable" (Guo et al., p. 366).

Because respondents may not represent a random sample of all youth who had been discharged, it was necessary to investigate the possibility of response bias. For example, because youth who drop out of the treatment program may also be less likely to respond to one-year follow-up surveys, the possible impact of the relationship between one-year outcomes and explanatory variables must be explored. An effective way to do this is through the use of the two-stage approach previously described; the probability of response is calculated in a first stage equation, which is then used as a control variable in the second stage (outcome) equation. A statistically significant coefficient on the 'probability of response' variable indicates presence of response bias and controls for the bias found (Rosenbaum & Rubin). Lack of a statistically significant coefficient may indicate that response bias is absent. Unfortunately it may also indicate an inability to detect the response bias due to unmeasured differences between those who did and did not respond.

As a strategy for handling selection (response) bias, this multi-stage process imposes quite a burden on the researcher to demonstrate the effectiveness of the model in identifying and controlling bias. One of the limitations of the Heckman model (and extensions thereof) is the depth and breadth of data required to make it work. As previously stated, estimation of treatment effects has been demonstrated to be sensitive to the array of variables used to create the probability score. If the researcher has few variables from which to choose, if the variables are only tangentially related to the probability of group membership, or if the data suffers from high and/or variable levels of non-response within the potential list of variables, it is unlikely that this strategy will be of use in handling potential bias. This study is fortunate to have access to a wide array of clinically relevant variables that will be used to attempt to correct for potential response bias. These robust data resources increase the likelihood of success in overcoming issues of response bias within the study sample.

3.5.3.2 Detection and Control of Collinearity and Redundancy

Preliminary procedures focused on data reduction to minimize collinearity and redundancy. Using SPSS Rel. 12.0, a careful review of Pearson correlations was

conducted with each pair of independent variables to pinpoint those related in a collinear fashion. As anticipated, significant correlation was found among a number of potential predictors. The first method for reducing the potentially negative impact of multicollinearity was to combine variables based on logical groupings. For example, data were gathered on specific family risk factors including parental history of psychosis, mental health treatment, suicide attempts, substance abuse, domestic violence, and contact with legal authorities. All of these family risk factors were combined into a count variable. This approach had the advantage of providing a single ratio-level measure in place of six dichotomous variables.

After reviewing the potential predictors and reducing the data in the manner described above, concern still remained regarding the level of correlation among variables. Specifically, eleven variables were available to capture clinical characteristics of youth. Both Pearson correlations and partial correlations revealed substantial overlap among the variables. A series of logistic regressions (SAS, Version 9.1.3) were conducted to determine if a smaller set of variables could be determined to be efficient predictors of the larger group. While this analysis pointed to the interrelated nature of the potential predictors, no clear direction emerged for further reducing these variables.

The third approach used to reduce the level of multicollinearity between the potential predictors was principal components analysis (PCA using SPSS Rel. 12.0) to determine if the 11 clinical characteristics could be empirically grouped into a smaller number of factors, each capturing a similar underlying construct. This method of data reduction had the advantage of significantly reducing, if not eliminating, correlation between the identified factors, which rendered it particularly appealing in this study as correlation among potential predictors was a significant barrier to creating a convergent multilevel model.

3.5.2 Multilevel Modeling

Multilevel modeling is one method for addressing some of the most important challenges presented by data with a nested or inherently hierarchical structure. First, this method does not force the researcher into an inappropriate choice of unit of analysis (individual level vs. organizational level), but rather recognizes that all levels exist and are important to the analysis (Raudenbush & Bryk, 2002). Second, multilevel modeling allows for a correct estimation of the standard errors (Raudenbush & Bryk; Gelman & Hill, 2007). Using the individual observations independently would probably yield low standard errors (partly due to the large sample size), but this would not be an accurate representation of the data; neither would an analysis that had observations at the organizational level only (yielding a much smaller sample size). Third, variation in regression across level 2 units can be accurately modeled, as this analytic tool allows for both intercepts and slopes to vary at level 2 (Raudenbush & Bryk). Fourth, analysis strategies that do not recognize the inherent structure of the data risk committing the ecological fallacy, that is, inappropriately attributing group-level characteristics to individuals (Raudenbush & Bryk). For example, a negative relationship between age of youth and long-term outcome might lead to a conclusion that the intervention was more effective for younger children than older children. If, however, clients were assigned to offices based on age of youth, then it is possible that the effectiveness of the intervention is due to characteristics of offices that served older youth, rather than to the actual age of the youth. Finally, linear regression models typically do not adequately

handle substantially differing sample sizes. Multilevel modeling accommodates this situation, borrowing strength from the aggregate data to minimize the impact of having large differences in the sizes of level 2 units (Raudenbush & Bryk).

3.5.3 Model Estimation

The HLM 6.0 package (Raudenbush, Bryk, Cheong, & Congdon, 2004), was employed in the analysis. The multilevel models in this study were designed to provide information on the usefulness of various factors in predicting long-term outcomes following IIHS. Given that the primary intent is to discover the factors that most significantly impacted outcomes and thus may be amenable to interventions aimed toward program improvement, the models focused on the specific samples at hand, which represented the population of youth served in this program. Admission criteria were the same for each office and there was no reason to expect that demographics, clinical characteristics, family characteristics, or characteristics of program participation would vary significantly across offices. For these reasons, a fixed-effects model was deemed most appropriate.

Derivation of the model to be estimated was accomplished following the example of Judith Singer (1998). This process provided a clear understanding of the parameters in the model, the distributions used to predict probability of positive outcomes, and results provided by the multilevel analysis. Additional information on the logic of multilevel models was also found in the work of Raudenbush and Bryk (2002) and in that of Gelman and Hill (2007).

Given the binary nature of four of the outcomes of interest, along with the fifth outcome which is categorical, a continuous linear regression model, with linear predictors plus an error term, cannot be fitted to the data when outcomes take on values of only 0 or 1 (or, in the case of the categorical outcome, values of 1, 2, or 3). Instead of modeling the actual outcomes, the probability of a particular outcome was modeled. Since probabilities can take on any value between 0 and 1, logistic regression can be employed to constrain the regression line to lie within the appropriate range.

The probability of a positive outcome for the i^{th} youth in the j^{th} office can be expressed as:

$$Y_{ij} \mid \phi_{ij} \sim B(m_{ij}, \phi_{ij}). \quad (\text{Eq. 3-1})$$

Y_{ij} has a binomial distribution with m_{ij} trials; the probability of success is ϕ_{ij} . Based on the binomial distribution, Y_{ij} has an expected value and variance of:

$$E(Y_{ij} \mid \phi_{ij}) = m_{ij}\phi_{ij} \quad \text{Var}(Y_{ij} \mid \phi_{ij}) = m_{ij}\phi_{ij}(1 - \phi_{ij}). \quad (\text{Eq. 3-2})$$

For the binary outcomes, the Bernoulli distribution was employed, which is a special case of the binomial distribution when $m_{ij} = 1$. With the Bernoulli distribution, the predicted value of Y_{ij} is equal to the probability of a success, ϕ_{ij} .

HLM employs a logit link function with binomial distributions:

$$\eta_{ij} = \log(\phi_{ij} / (1 - \phi_{ij})), \quad (\text{Eq. 3-3})$$

which represents the log odds of success. Although ϕ_{ij} is constrained to lie within the interval (0, 1), η_{ij} can take on any real value. When the probability of success is 0.5, the odds are 1.0 and the log-odds (logit) take on the value of zero. As the probability of success decreases, the odds become less than one and the logit is a negative number. As probability of success increases beyond 0.5, the odds are greater than one and the logit is a positive number.

To understand the variation between offices in the odds of a positive outcome, an unconditional model can be constructed that has no predictors at either Level 1 or Level 2:

$$\eta_{ij} = \beta_{0j}. \quad (\text{Eq. 3-4})$$

At Level 2, the office level intercepts (β_{0j}) are the sum of the overall mean (γ_{00}) and a series of random deviations from that mean (u_{0j}):

$$\beta_{0j} = \gamma_{00} + u_{0j}, \quad \text{where } u_{0j} \sim N(0, \tau_{00}). \quad (\text{Eq. 3-5})$$

Substituting this equation into the previous one provides the unconditional multilevel model:

$$\eta_{ij} = \gamma_{00} + u_{0j}, \quad \text{where } u_{0j} \sim N(0, \tau_{00}). \quad (\text{Eq. 3-6})$$

The model estimates both the fixed effect (the γ term), that is, the overall intercept (the grand mean of log odds across all offices) as well as the random effect (u_{0j}) associated with variability in office-average log odds of a positive outcome.

When Level 2 variables are added to the model, it becomes a conditional model, in which log odds of a positive outcome are expressed as a function of office-level characteristics (namely office size and mean turnover, both log transformed to correct for skewness). The conditional model can be written thus:

$$\eta_{ij} = \beta_{0j} \text{ and } \beta_{0j} = \gamma_{00} + \gamma_{01}\text{LOGSIZE} + \gamma_{02}\text{LOGMEANTURN} + u_{0j}, \quad \text{where } u_{0j} \sim N(0, \tau_{00}). \quad (\text{Eq. 3-7})$$

Substitution yields the conditional multilevel model:

$$\eta_{ij} = \gamma_{00} + \gamma_{01}\text{LOGSIZE} + \gamma_{02}\text{LOGMEANTURN} + u_{0j}. \quad (\text{Eq. 3-8})$$

The first three terms on the right side of the equation represent the fixed effects in the model, with the last term representing the random variation between offices.

This model estimates γ_{00} , which is the average office log odds of a positive outcome when the remaining predictors are 0. By grand-centering the office-level predictors for each sample (subtracting the value of the variable from the grand mean for the entire sample), γ_{00} represents the average office log odds of a positive outcome in an office of average size with average turnover. The coefficients for LOGSIZE and LOGMEANTURN describe the relationship between log odds of a successful outcome and each effect. Thus, the coefficient for LOGSIZE represents the difference in log odds of a positive outcome between each office and an office of average size. Likewise, the

coefficient for LOGMEANTURN describes the difference in log odds of a positive outcome between each office and an office that has an average monthly turnover.

When Level 1 predictors, that is, youth-level factors, are added, the model can be written as:

$$\begin{aligned} \eta_{ij} = & \gamma_{00} + \gamma_{01}*(LOGSIZE_j - LOGSIZE) + \gamma_{02}*(LOGTURNOVER_j - LOGTURNOVER) + \\ & \gamma_{10}*MALE_{ij} + \gamma_{20}*BLACK_{ij} + \gamma_{30}*AGE_{ij} + \\ & \gamma_{40}*YEAR2001_{ij} + \gamma_{50}*YEAR2002_{ij} + \gamma_{60}*YEAR2003_{ij} + \gamma_{70}*YEAR2004_{ij} + \gamma_{80}*YEAR2005_{ij} + \\ & \gamma_{90}*FSCANTI_{ij} + \gamma_{100}*FSCVICTIM_{ij} + \gamma_{110}*FSCEMOTION_{ij} + \\ & \gamma_{120}*LOGLOS_{ij} + \gamma_{130}*PRIMCOUNSELOR_{ij} + \\ & \gamma_{140}*FAMHXCOUNT_{ij} + \\ & \gamma_{150}*INDEX_Y_{ij} + \mu_{0j}. \end{aligned} \quad (\text{Eq. 3-9})$$

Note that all youth characteristics are entered as fixed effects. If the Level 1 predictors were random effects, then an additional parameter for the random effect would also have been added for each predictor, which would have captured the variation in each predictor across offices. For example, had AGE been entered as a random effect, then both the log odds of a positive outcome related to AGE, as well as AGE itself, could vary across offices. In this study youth characteristics are assumed not to vary significantly across offices, since admission criteria are the same across all offices. Thus, the effects for youth characteristics were ‘fixed’ because the parameters associated with variation in the characteristics across offices were not included. Simply stated, the model allowed for varying intercepts, but not varying slopes, across offices.

The Level 1 variables in the model included youth demographic characteristics (gender, age, and race), indicators for year of discharge, factors representing clinical characteristics of youth, characteristics of program participation, family characteristics, and a correction factor for response bias (discussed in detail in section 3.5.3.1). For gender, MALE was coded 1 if male and 0 if female, while for race BLACK was coded 1 for African-American and 0 otherwise, and AGE was calculated as age in years at admission to the program. Five indicators for year of discharge were included: each was coded 1 if discharge occurred during the indicated year and 0 otherwise (the reference year was 2006). Three factors derived from principal components analysis (PCA; further described in section 3.5.3.2) were included in the models: FSCANTI was the factor for antisocial behavior, FSCVICT represented the factor for victim of abuse and/or neglect, and FSCEMOTION was the factor for emotional difficulties. Characteristics of program participation were indicated by LOGLOS, the log length of service and PRIMCOUNSELOR, a variable coded 1 if the youth had a primary counselor who wrote at least 75% of the service notes and 0 otherwise. FAMHXCOUNT was a count of difficulties in a family’s history including mental illness, legal involvement/domestic violence, and substance abuse. The correction factor for response bias was entered into the models as INDEX_Y. The model included an error term (μ_{0j}) to capture random deviations from the office-level average log odds.

The model shown in Equation 9 was used to predict one-year postdischarge outcomes of placement with family, contact with legal authorities, educational progress, and out-of-home placements. Each of the outcomes was modeled for the child, adolescent, and combined samples.

The composite outcome, which is an ordinal measure with three categories, required a slightly different model. As shown in Equation 3-10, the model included a term ($\delta_{(2)}$) to capture the difference between the probabilities of falling into the desirable category relative to the undesirable category versus falling into the desirable *or* mixed category relative to the undesirable category. All other parameters in the model are the same as in Equation 3-9.

$$\begin{aligned} \eta_{ij} = & \gamma_{00} + \gamma_{01}*(LOGSIZE_j - LOGSIZE) + \gamma_{02}*(LOGTURNOVER_j - LOGTURNOVER) + \\ & \gamma_{10}*MALE_{ij} + \gamma_{20}*BLACK_{ij} + \gamma_{30}*AGE_{ij} + \\ & \gamma_{40}*YEAR2001_{ij} + \gamma_{50}*YEAR2002_{ij} + \gamma_{60}*YEAR2003_{ij} + \gamma_{70}*YEAR2004_{ij} + \gamma_{80}*YEAR2005_{ij} + \\ & \gamma_{90}*FSCANTI_{ij} + \gamma_{100}*FSCVICTIM_{ij} + \gamma_{110}*FSCEMOTION_{ij} + \\ & \gamma_{120}*LOGLOS_{ij} + \gamma_{130}*PRIMCOUNSELOR_{ij} + \\ & \gamma_{140}*FAMHXCOUNT_{ij} + \gamma_{150}*INDEX_Y_{ij} + \delta_{(2)} + \mu_{0j}. \end{aligned} \quad (Eq. 3-10)$$

3.6 Summary of Methodology

Accurately assessing the influence of multilevel factors on long-term outcomes following IIHS required both rich data resources and sophisticated statistical tools. This study used data uniquely suited to this purpose, as a wide array of characteristics of youth, program participation, and offices were available. Multilevel modeling allowed for the most effective examination of these factors, given the hierarchical structure of the data. This methodology provided important information that will be essential in targeting program improvements to areas most likely to yield substantial gains for youth and their families.

CHAPTER 4: FINDINGS

4.1 Description of Sample

The sample of clients included 2,649 youth served out of 20 offices. Analyses were conducted separately for children (under 13 years of age; $n = 1,056$) and adolescents (age 13 and over; $n = 1,593$) as well as for the combined sample. Both children and adolescents were found in each of the offices. Table 2 provides detail on youth characteristics of the entire sample as well as for the child and the adolescent groups. All comparisons below (section 4.1.1 and noted in Table 2) refer to the differences between the child and adolescent samples. Given the multiple comparisons, the Bonferroni correction was used to assess significance of the observed differences; only differences greater than $p < .001$ were considered statistically significant.

4.1.1 Youth Characteristics

Among all youth in the sample, 63.5% were male, 25.3% were African-American, and the average age was 13.1 years. In the sample of children, 70.5% were male, 21.9% were African-American, and the average age was 9.7 years. The adolescent sample contained a smaller percentage of males (58.8% male; $\chi^2 = 37.693$, $p < .001$) and a larger percentage of African-Americans (27.5%; $\chi^2 = 10.626$, $p < .001$). Average age for the adolescent sample was 15.3 years.

More than 95% in of youth in the sample presented with behavioral disorders; 96.3% of the child sample and 95.4% of the adolescent sample reported behavioral problems. Nearly half (48.1%) of the youth indicated emotional disorders. These issues were more prevalent among adolescents than children (child sample - 43.2%, adolescent sample - 51.4%; $\chi^2 = 15.988$, $p < .001$). Reports of suicide ideations and/or gestures were somewhat less common, with 41.8% of the total sample positive for this issue (40.1% in child sample; 43.0% in adolescent sample). Physical abuse, sexual abuse, and neglect were all reported in less than 20% of the sample of youth; these issues were slightly more prevalent in the child sample (physical abuse – 15.5%, sexual abuse – 20.2%, neglect – 15.4%) than in the adolescent sample (physical abuse – 14.0%, sexual abuse – 19.0%, neglect – 9.1%), although only the percent reporting neglect was statistically significant between the two groups ($\chi^2 = 22.885$, $p < .001$).

Overall, approximately half (47.5%) of the youth had involvement with the legal system, nearly a third (30.4%) indicated substance use/abuse, slightly more than a third (34.3%) had run away at least once, and 43.1% reported associating with negative peers. The adolescent sample was marked by substantially higher participation in these antisocial behaviors than the child sample: 64.9% of the adolescent sample had legal involvement versus only 21.4% of the child sample ($\chi^2 = 438.338$, $p < .001$); 46.0% of the adolescents reported substance use/abuse, while only 7.2% of children reported such behavior ($\chi^2 = 419.693$, $p < .001$). More than a third (41.5%) of the adolescent sample had run away from home, while 23.4% of the child sample had run away ($\chi^2 = 85.707$, $p < .001$); 62.4% of the adolescents reported associating with negative peers while only 14.3% of children reported such associations ($\chi^2 = 556.277$, $p < .001$).

Table 2. Sample Characteristics

Variables	% or M (SD)		
	Child (n = 1,056)	Adolescent (n = 1,593)	Combined (n = 2,649)
Demographics			
Age (in Years)**	9.7 (2.5)	15.3 (1.2)	13.1 (3.3)
Gender (Male)**	70.5%	58.8%	63.5%
Race/Ethnicity (African American)*	21.9%	27.5%	25.3%
Clinical Characteristics			
Behavioral Disorders	96.3%	95.4%	95.8%
Emotional Disorders**	42.3%	51.4%	48.1%
Suicide Ideation or Gestures**	37.4%	39.7%	38.9%
Legal Involvement**	21.4%	64.9%	47.5%
Substance Abuse**	7.2%	46.0%	30.4%
Runaway**	23.4%	41.5%	34.3%
Associates with Negative Peers**	14.3%	62.4%	43.1%
Difficulty Making/Maintaining Friendships**	64.7%	49.2%	55.4%
Neglect**	15.4%	9.1%	11.6%
Physical Abuse	15.5%	14.0%	14.6%
Sexual Abuse	20.2%	19.0%	19.4%
Received Educational Resources	42.2%	38.8%	40.2%
Sexually Active**	5.2%	42.9%	27.8%
Family Characteristics			
Spiritual Affiliation	68.0%	65.2%	66.3%
Weapons in the Home	24.1%	22.7%	23.3%
Substance Abuse	39.5%	41.4%	40.7%
Mental Illness*	64.0%	57.6%	60.2%
Legal Involvement/ Domestic Violence*	51.2%	45.9%	48.0%
Lives in High Crime Area	9.9%	12.1%	11.2%
Income*			
Low Income	73.9%	68.7%	70.7%
Not Low Income	12.9%	15.6%	14.5%
No Information Available	13.3%	15.8%	14.8%
Family Composition (Bio Parents)**			
Grandparents in the Home**	49.7%	38.9%	43.2%
Parental Involvement in School**	62.4%	50.3%	55.2%
Program Participation			
Year of Discharge			
2001	6.9%	8.1%	7.6%
2002	14.7%	12.6%	13.4%
2003	18.8%	16.2%	17.3%
2004	17.4%	19.4%	18.6%
2005	19.1%	21.2%	20.3%
2006	23.0%	22.6%	22.8%
Length of Service in Days**	145.3 (59.2)	137.3 (55.0)	140.5 (56.8)

Table 2. (cont.)

Variables	% or M (SD)		
	Child (n = 1,056)	Adolescent (n = 1,593)	Combined (n = 2,649)
Program Participation (cont.)			
Family Sessions**	51.7 (21.6)	48.7 (20.2)	49.9 (20.8)
Total Services Time in Hours*	64.4 (34.3)	60.5 (29.4)	62.1 (29.7)
Collateral Contacts	28.5 (24.5)	29.5 (24.3)	29.1 (24.3)
Youth had Primary Counselor	73.2%	73.7%	73.5%
Funding Source (Medicaid)**	83.1%	71.1%	75.9%
Discharged to Family**	92.7%	86.1%	88.7%
Dependent Variables - Outcomes at One-Year Postdischarge			
Placement**			
Living with Family			
vs. Not Living with Family	89.6%	84.5%	86.5%
Educational Progress**			
In School or GED Classes/			
Completed School	71.5%	63.0%	66.4%
No Data Available	26.5%	27.9%	27.4%
Contact with Juvenile Authorities**			
Any Contact in the			
Past Six Months	3.7%	13.9%	9.8%
No Data Available	32.9%	30.7%	31.6%
Out-of-home Placements During			
Past Six Months**	6.7%	11.5%	9.6%
Composite Outcome**			
Desirable	55.5%	43.4%	48.2%
Mixed	6.3%	17.1%	12.8%
Undesirable	10.4%	15.5%	13.5%
Unable to Calculate	27.7%	24.0%	25.5%

* $p < .05$; ** $p < .001$

A variety of family risk factors were observed in each sample. More than half (60.2%) the families had a history of mental illness (64.0% in child sample, 57.6% in adolescent sample; $\chi^2 = 9.203$, $p < .001$), more a third (40.7%) of the sample reported a history of substance abuse (39.5% in child sample, 41.4% in adolescent sample; difference not statistically significant), and nearly half (48.0%) reported a history of legal involvement and/or domestic violence. Families of children were slightly more likely to report legal involvement or domestic violence (51.2%) than families of adolescents (45.9%; $\chi^2 = 6.180$, $p < .05$).

A relatively small portion (11.2%) of families reported living in a high crime area (9.9% in child sample, 12.1% in adolescent sample; difference not statistically significant). More than 20% of families reported having weapons in their home (24.1% of child sample, 22.7% of adolescent sample; difference not statistically significant). Nearly two-thirds (66.3%) of families reported that they had a spiritual affiliation (68.0% of child sample, 65.2% of adolescent sample; difference not statistically significant).

Mean length of service was longer for children (145.3 days) than for adolescents (137.3 days; $t = 3.529$, $p < .001$). Children also had more family sessions (51.7) than adolescents (48.7; $t = 3.581$, $p < .001$) and more total service time (child sample - 64.4 hours, adolescent sample - 60.5 hours; $t = 3.319$, $p < .001$). Nearly three quarters of youth had a primary counselor, that is, a single counselor who wrote at least 75% of the notes on the case (73.2% of child sample; 73.7% of adolescent sample; difference not statistically significant).

4.1.2 Organizational Characteristics

Youth in the study were served in 20 offices across the southeastern US and the District of Columbia. Six of the offices served less than 200 cases each during the study period, while two offices served more than 1,000 youth each. The mean number of cases served during the study period was 405.6 (S.D. = 289.6). Mean monthly turnover among counselors was 3.3% (S.D. = 1.0%) across offices, and ranged from 1.53% to 5.65%. Detailed information concerning office characteristics, as well as youth characteristics within offices, can be found in Table 3.

4.2 Results of Diagnostic Analysis

Two issues with the potential to significantly affect the study findings were examined during the diagnostic phase of the analysis. First, the sample used in the multilevel analysis contained only those who had completed a survey at one-year postdischarge; significant differences between responders and non-responders were investigated. A 'probability to respond' score was created and entered into the multilevel analysis to seek to control for the potential response bias associated with the data collection situation. Second, significant correlations were found to exist among several independent variables that were to be entered in the multilevel analysis. Careful examination of the problem was conducted and principal components analysis was employed as a data reduction strategy.

Table 3. Sample Characteristics by Office

Office	Size N	Turnover %	Male %	Black %	Age M (SD)	Length of Service M (SD)	Placement At Follow-up %	Contact with Legal Authorities %	Educational Progress %	Out-of-Home Placements %	Composite (Desirable) %
Anniston, AL	194	3.11	56.94	19.44	10.50 (4.43)	157.49 (66.15)	88.89	2.70	80.00	8.33	56.82
Chattanooga, TN	460	3.93	68.13	22.53	13.62 (2.75)	134.17 (58.27)	90.11	14.29	88.55	8.79	68.22
Clarksville, TN	317	3.48	69.66	14.61	12.64 (3.52)	137.75 (40.54)	91.01	1.67	97.01	10.11	76.56
Columbia, TN	577	3.05	70.42	10.33	12.81 (3.36)	130.34 (34.32)	86.85	16.90	93.51	4.70	63.46
Cookeville, TN	557	2.35	62.63	3.16	13.18 (3.28)	138.29 (49.37)	87.89	12.31	94.85	7.37	70.00
Dallas, TX	398	4.54	59.21	42.76	15.32 (1.41)	122.39 (41.56)	75.00	24.03	84.11	23.03	46.55
Dickson, TN	194	3.36	60.87	4.35	12.38 (3.48)	138.39 (35.07)	93.48	6.67	100.00	4.35	87.10
Dyersburg, TN	251	1.53	64.71	19.61	13.18 (2.89)	127.92 (40.10)	82.35	30.30	97.14	5.88	55.26
Hattiesburg, MS	126	2.83	50.77	43.08	12.25 (3.72)	201.37 (103.91)	84.62	11.63	86.67	16.92	56.25
Huntsville, AL	198	5.65	47.67	37.21	11.64 (4.43)	159.56 (58.79)	93.02	3.13	83.82	5.81	73.13
Jackson, MS	154	3.85	63.24	57.35	12.77 (3.88)	183.94 (94.87)	77.94	4.08	94.12	8.82	63.64
Jackson, TN	550	2.85	66.91	34.53	13.07 (3.01)	134.12 (64.12)	84.17	12.63	92.08	7.19	65.09

Table 3. (cont.)

Office	Size N	Turnover %	Male %	Black %	Age M (SD)	Length of Service M (SD)	Placement At Follow-up %	Contact with Legal Authorities %	Educational Progress %	Out-of-Home Placements %	Composite (% Desirable) %
Johnson City, TN	438	2.38	67.86	5.36	13.24 (3.20)	139.02 (44.77)	91.07	17.31	91.07	6.55	63.39
Knoxville, TN	823	3.15	65.17	11.71	12.99 (3.24)	125.83 (40.93)	87.39	13.41	91.92	11.11	68.06
Memphis, TN	1,092	2.74	65.22	56.96	13.33 (2.89)	135.55 (49.94)	86.09	16.35	91.12	10.00	63.43
Morristown, TN	227	3.13	63.37	2.97	14.00 (2.89)	140.79 (46.01)	91.09	11.11	97.30	3.96	77.03
Nashville, TN	1,017	3.26	61.31	32.12	12.94 (3.11)	143.47 (58.04)	86.86	16.40	93.43	6.93	65.70
Paris, TN	236	2.55	66.67	8.77	12.40 (3.44)	134.30 (49.88)	91.23	11.43	94.44	7.02	74.36
Tupelo, MS	173	2.27	55.26	25.00	11.32 (3.72)	191.99 (83.56)	82.89	13.21	92.86	15.79	58.22
Washington, DC	129	5.31	56.14	96.49	14.81 (1.95)	148.70 (51.80)	70.18	32.65	80.85	29.82	38.00

4.2.1 Response Bias

The outcomes of interest in this study were collected via a phone survey at one-year postdischarge from the program. With a 60% response rate, it was important to determine if loss to follow-up introduced significant response bias into the estimation process. Comparisons were made using chi-square for binary and categorical variables and t-tests for independent samples for continuous variables for a wide variety of variables. Given the multiple comparisons, the Bonferroni correction was again used to evaluate statistical significance. Details of the chi-square and t-tests comparing responders and non-responders, which were conducted separately for the child, adolescent, and combined samples, are found in Table 4. Although few of the comparisons yielded statistically significant differences between respondents and non-respondents, more than a third of the comparisons demonstrated at least a marginally significant difference. Such differences between those included and excluded in the multilevel analysis suggested potentially important differences between respondents and non-respondents that should be considered.

A variant of the 'Heckman method' (Heckman, 1979) was employed to attempt to correct for possible bias introduced because of differences between those who did and did not respond to the one-year postdischarge survey. Previously described in section 3.5.3.1, this technique involved selecting variables related to the outcomes as well as to response status. Those variables were then used in a logistic regression with response status as the dependent variable. The coefficients resulting from the regression analysis, combined with each youth's actual data values, were used to create a 'probability of response' score (predicted probability) for each respondent, which was then entered as a covariate in the multilevel model.

Because the overall analysis plan called for the estimation of three different multilevel models (child, adolescent, combined) for each outcome, three separate logistic regressions were employed to model the likelihood of survey response. Following recommendations of Brookhart et al. (2006) all available variables that were related both to outcome and response were entered (see Table 4 for list of variables). A stepwise procedure was used to efficiently find the best-fitting models. Variables remaining in the regression equation for the child sample included length of service, indicator of parental involvement in school, indicator for weapons in the home, indicator for presence of grandparent in the home, number of family sessions, and number of collateral contacts. Homer-Lemeshow goodness-of-fit test indicated no significant lack of fit in this model ($p = .526$). For the adolescent sample, variables in the final model included race, family composition, length of service, parental involvement in school, spiritual affiliation, emotional difficulties, and indicators for year of discharge. This model also demonstrated adequate goodness-of-fit (Homer-Lemeshow test; $p = .459$). The model for the combined sample (child and adolescent) included race, family composition, length of service, parental involvement in school, spiritual affiliation, weapons in the home, and the five indicators for year of discharge (Homer-Lemeshow test; $p = .244$).

Coefficients from each model were used to calculate a 'probability of response' score that was entered in the multilevel model in order to seek to control for potential response bias. Although the goodness-of-fit statistics associated with these regressions were adequate, each model correctly classified less than 70% of the cases as

Table 4. Statistical Comparison of Respondents and Non-Respondents

Variables	<u>Child</u>	<u>Adolescent</u>	<u>Combined</u>	<u>t or χ^2</u>
Demographics				
Age (in Years)	-0.199	1.677	1.468	<i>t</i>
Gender (Male)	2.119	0.916	0.011	χ^2
Race/Ethnicity (African American)	0.011	5.863*	4.504*	χ^2
Clinical Characteristics				
Behavioral Disorders	4.057*	0.304	0.675	χ^2
Emotional Disorders	0.048	9.259*	5.933*	χ^2
Suicide Ideation or Gestures	0.000	0.404	0.213	χ^2
Legal Involvement	0.853	4.918*	3.496	χ^2
Substance Abuse	0.735	2.845	5.513*	χ^2
Runaway	0.104	0.914	1.539	χ^2
Associates with Negative Peers	0.020	3.885*	4.692*	χ^2
Difficulty Making/Maintaining Friendships	1.031	4.464*	6.282*	χ^2
Neglect	0.694	2.887	3.707	χ^2
Physical Abuse	1.619	2.171	0.119	χ^2
Sexual Abuse	0.248	4.061*	1.626	χ^2
Received Educational Resources	0.002	1.168	0.773	χ^2
Sexually Active	0.069	0.196	1.170	χ^2
Family Characteristics				
Spiritual Affiliation	7.919*	11.545*	19.808**	χ^2
Weapons in the Home	11.802*	3.754	13.341**	χ^2
Family History of Substance Abuse	0.540	0.019	0.132	χ^2
Family History of Mental Illness	0.013	0.434	0.492	χ^2
Family History of Legal Involvement/Domestic Violence	0.202	2.154	0.652	χ^2
Lives in High Crime Area	0.159	0.376	0.596	χ^2
Income				
Low Income	0.792	0.048	0.601	χ^2
Not Low Income	0.019	0.051	0.098	χ^2
No Information Available	1.012	0.003	0.464	χ^2
Family Composition (Bio Parents)	5.494*	10.853*	17.160**	χ^2
Grandparents in the Home	5.786*	8.560*	15.252**	χ^2
Parental Involvement in School	4.393*	11.038*	16.535**	χ^2

Table 4. (cont.)

Variables	<u>Child</u>	<u>Adolescent</u>	<u>Total</u>	<u>t or χ^2</u>
Program Participation Characteristics				
Year of Discharge				
2001	0.048	0.007	0.001	χ^2
2002	2.393	13.607**	14.761**	χ^2
2003	0.088	2.747	2.059	χ^2
2004	1.244	7.927*	8.805*	χ^2
2005	0.742	0.658	0.009	χ^2
2006	0.207	0.501	0.610	χ^2
Length of Service in Days	-10.382**	-9.527**	-13.978**	<i>t</i>
Number of Family Sessions	-10.081**	-9.116**	-13.573**	<i>t</i>
Total Service Time in Hours	-8.279**	-8.818**	-12.103**	<i>t</i>
Collateral Contacts	-3.525*	-3.223*	-4.648**	<i>t</i>
Youth had Primary Counselor	0.744	3.818	4.317*	χ^2
Funding Source (Medicaid)	2.839	5.717*	1.790	χ^2
Discharged to Family	0.404	6.585*	4.319*	χ^2

* $p < .05$; ** $p < .001$

respondents or non-respondents. It is possible that either a more sophisticated model was needed to account for interactions among the independent variables influencing response status, or that measures of the true determinants of responding were not included in the model.

4.2.2 Interaction among Independent Variables

A wide variety of data were available in this study to examine the proposed research question. Initial correlational analysis suggested, however, that many of the potential predictors were significantly related to each other. Since multicollinearity among the variables will yield non-converging models in the multilevel analysis, additional steps were undertaken to determine the most appropriate method to achieve data reduction. First, a series of partial correlations (for scale variables) and layered chi-squares (for categorical variables) was conducted to get a clearer picture of the underlying structure of the data. These analyses pointed to several groups of related variables within the broad categories of clinical characteristics, family characteristics, and characteristics of program participation.

The next step was to determine if any of the potential covariates were well-predicted by any other covariates. If such relationships were found, either the predicted variable or the predictors would be removed from the list of variables to be entered into the multilevel model. A series of regression analyses were conducted in which each potential predictor was entered as a dependent variable, with all other predictors entered on the right-hand side of the equation. Results of the analyses indicated that each variable entered as a dependent variable was significantly predicted by at least three other variables. While it was apparent from the pattern of significant relationships that there were variables that seemed to group together, this analysis provided no clear direction as to which particular variables should be removed from the list of potential covariates.

In an effort to preserve as much information as possible while addressing the multicollinearity problem, principle components analysis (PCA) was conducted to determine if some of the variables that seemed to be related in previous diagnostic procedures were, in fact, measuring a similar underlying construct. Using Varimax rotation, eleven clinical characteristics were entered into a PCA. Table 5 provides detail regarding the variables that were entered into the PCA, the factors that resulted (including eigenvalues), and the loadings from the rotated component matrix for each of the variables.

The eleven clinical characteristics produced three factors with eigenvalues well above 1.0. The first factor, *Antisocial Behavior*, appeared to strongly represent antisocial behavior, with client legal involvement, client substance abuse, runaway, and association with negative peers loading heavily on this factor. The second factor to emerge out of the clinical characteristics, *Victim of Abuse/Neglect*, seemed to capture reports of abuse and/or neglect, as the variables physical abuse, sexual abuse, and neglect all had loadings over .4 on this factor. *Emotional Difficulties* seemed to be captured by the third factor, with emotional disorders and suicide ideations/gestures both loading on this factor.

Table 5. Results from Principal Components Analysis

Variables	Factor Loadings		
	Antisocial Behavior	Victim of Abuse/ Neglect	Emotional Difficulties
Eigenvalues	(2.180)	(1.566)	(1.273)
Behavioral Disorders	.165	.002	-.114
Emotional Disorders	.012	.079	.749
Suicide Ideation or Gestures	.100	-.006	.765
Legal Involvement	.737	-.023	-.092
Substance Abuse	.774	-.034	.042
Runaway	.473	.000	.125
Associates with Negative Peers	.819	-.044	.043
Difficulty with Friends	-.263	.065	.325
Neglect	-.064	.744	-.164
Physical Abuse	.020	.763	.059
Sexual Abuse	-.041	.499	.251

4.3 Results of Multilevel Analysis

The multilevel model contained the following variables at Level 1: demographics (dummy variable for male, dummy variable for African-American, client age in years), study year (set of five dummy variables representing the six years of the study, with 2006 as the reference year), factor scores representing clinical characteristics (Antisocial Behavior, Victim of Abuse/Neglect, Emotional Difficulties), length of service (log transformed), indicator for presence of a primary counselor, count of family history difficulties, and the 'propensity to respond' score. At Level 2, log-transformed variables for size of the office (number of cases) and mean monthly turnover among counselors were included in the model.

For each of the outcomes, information is presented on the coefficients (log odds) of all variables in the models along with the odds ratio. Probability can be calculated from the odds ratios (OR) as $OR/1-OR$. With this calculation, it is possible to determine the increase (decrease) in the probability of the indicated outcome given a unit increase in the variable of interest.

4.3.1 Predictors of Placement Stability

As shown in Table 6, several factors, all at Level 1, predicted odds of placement at one-year postdischarge (1 = Placement with family, 0 = Placement in a restrictive setting) for the combined sample of children and adolescents. Gender, anti-social behavior, being a victim of abuse/neglect, and length of service were all predictive of odds of placement with family. Males were less likely to be placed with family at one-year postdischarge, as were those who exhibited antisocial behavior and those who were victims of abuse and/or neglect. Length of service was negatively related to odds of placement; as length of service increased, odds of placement with family decreased.

One of the time indicators (2005) demonstrated a significant negative relationship, indicating that youth discharged in 2005 had a lower odds of placement with family than youth discharged in the reference year of 2006. The indicator for 2002 was marginally negatively related to placement with family. The correction for response bias also showed a positive, significant effect on odds of placement with family at one-year postdischarge. This suggested that sample inclusion (providing one-year follow-up information) was positively related to the odds of placement with family.

Predictors of placement with family for the child sample were a bit different than for the combined sample. Age was a significant predictor of odds of positive outcome in the child sample; as age increased the odds of placement with family decreased. Length of service exhibited the same relationship in the child sample as in the overall sample; as length of service increased, odds of placement with family decreased. Having a primary counselor was marginally, negatively associated with placement with family at one-year postdischarge; children who had a single counselor who conducted at least 75% of family sessions were less likely to be placed with their family. Emotional difficulties were a marginal, positive predictor of the odds of placement with family, indicating that children with emotional difficulties are more likely to be placed with family at one-year postdischarge. None of the time indicators were significant predictors in the child sample. The correction factor for response bias was significantly and positively related to odds of postdischarge placement with family.

Table 6. HLM Estimation Results: Placement at One-Year Postdischarge

Variables	Coefficient (Odds Ratio)		
	Child	Adolescent	Combined
Intercept	12.620****	0.500	7.035****
Level 1: Youth Variables			
Gender (Male)	-0.344 (0.709)	-0.398** (0.672)	-0.331** (0.718)
Race/Ethnicity (African American)	-0.234 (0.791)	-0.235 (0.791)	-0.226 (0.798)
Age (in Years)	-0.129** (0.879)	0.179*** (1.196)	-0.017 (0.983)
Antisocial Behaviors	-0.261 (0.770)	-0.322**** (0.725)	-0.292**** (0.747)
Victim of Abuse/Neglect	-0.079 (0.924)	-0.116 (0.890)	-0.124** (0.883)
Emotional Disorders	0.260* (1.297)	-0.009 (0.991)	0.087 (1.090)
Count of Family Problems	0.053 (1.054)	0.090 (1.094)	0.082 (1.086)
Length of Service (Log Transformed)	-1.857*** (0.156)	-0.211 (0.810)	-0.977*** (0.376)
Primary Counselor	-0.503* (0.604)	-0.020 (0.980)	-0.194 (0.824)
Year 2001	0.095 (1.100)	-0.004 (0.996)	-0.003 (0.997)
Year 2002	-0.099 (0.906)	-0.374 (0.688)	-0.412* (0.662)
Year 2003	-0.330 (0.719)	-0.119 (0.888)	-0.130 (0.878)
Year 2004	-0.331 (0.718)	-0.186 (0.831)	-0.183 (0.833)
Year 2005	-0.225 (0.799)	-0.558** (0.572)	-0.481** (0.618)
Correction for Response Bias	0.993*** (2.699)	0.212 (1.236)	0.670*** (1.954)
Level 2: Organizational Variables			
Size (Log Transformed)	0.189 (1.208)	0.006 (1.006)	0.080 (1.083)
Monthly Turnover (Log Transformed)	-0.039 (0.962)	0.003 (1.003)	0.036 (1.037)

* $p < .10$. ** $p < .05$. *** $p < .01$. **** $p < .001$.

For the adolescent sample, being male and having antisocial behaviors were significant predictors of lower odds of placement with family at one-year postdischarge. As with the child sample, age was also a significant predictor, but not in the expected direction; as age increased so did the odds of placement with family at one-year postdischarge. One of the indicators for time, Year 2005, returned a significant coefficient (adolescents discharged in 2005 had a lower odds of placement with family compared with those discharged in 2006).

4.3.2 Predictors of Educational Progress

The predictors of educational progress were similar to those for placement with family at one-year postdischarge (see Table 7). Age, antisocial behavior, and length of service were all important predictors of odds of educational progress at one-year postdischarge. Among all youth, age had a significant negative relationship, indicating that as youth age increased, the odds of being in school, graduated from high school, or in GED classes at the time of follow-up decreased. Antisocial behavior and length of service also displayed significant negative relationships with odds of educational progress at one-year postdischarge. Mean monthly turnover was marginally negatively related to odds of educational progress; as turnover increased the odds of positive educational progress decreased. The correction for response bias was a significant positive predictor for odds of educational progress in the combined sample.

For the child sample, gender, age, and antisocial behavior were strong predictors of educational progress. Males had higher odds of educational progress at one-year postdischarge, as did those at the older end of the child sample. Antisocial behavior was associated with significantly lower odds of educational progress at one-year postdischarge among the child sample. None of the characteristics of program participation, family characteristics, level 2 (organizational) characteristics, nor the time indicators were predictive of the odds of educational progress at one-year postdischarge for the child sample.

For adolescents, age was a strong negative predictor of the odds of education progress. Increasing age was significantly associated with decreases in the odds of being in school, graduated from high school, or in GED classes at one-year postdischarge. With each one year increase in age, the probability of adolescents making education progress decreased by .357. Antisocial behavior was a significant negative predictor of odds of educational progress, as was length of service. Mean monthly turnover was a marginally negative predictor of the odds of educational progress; as turnover increased, odds for youth served in the office to be in school, graduated from high school, or in GED classes at follow-up decreased. Neither a history of family difficulties nor the time indicators were significant predictors of odds of educational progress for the adolescents. The correction factor for response bias was marginally positively related to odds of educational progress.

4.3.3 Predictors of Contact with Legal Authorities

The results of the third set of HLM estimations are presented in Table 8. Both age and gender demonstrated significant influences on contact with legal authorities in the overall sample. Males were more likely to have contact with legal authorities as

Table 7. HLM Estimation Results: Educational Status at One-Year Postdischarge

Variables	Coefficient (Odds Ratio)		
	Child	Adolescent	Combined
Intercept	-3.326	17.270****	10.566****
Level 1: Youth Variables			
Gender (Male)	1.454*** (4.282)	0.060 (1.062)	0.196 (1.216)
Race/Ethnicity (African American)	0.764 (2.146)	0.256 (1.292)	0.359 (1.431)
Age (in Years)	0.272*** (1.313)	-0.587**** (0.556)	-0.221**** (0.802)
Antisocial Behaviors	-1.127*** (0.324)	-0.277** (0.758)	-0.313*** (0.731)
Victim of Abuse/Neglect	0.347 (1.415)	0.154 (1.166)	0.132 (1.142)
Emotional Disorders	0.121 (1.128)	0.017 (1.018)	0.069 (1.071)
Count of Family Difficulties	0.092 (1.096)	0.016 (1.016)	0.034 (1.034)
Length of Service (Log Transformed)	0.547 (1.729)	-1.308** (0.270)	-1.180** (0.307)
Primary Counselor	0.107 (1.113)	0.217 (1.242)	0.264 (1.302)
Year 2001	-0.519 (0.595)	-0.580 (0.560)	-0.587 (0.556)
Year 2002	-0.834 (0.434)	-0.509 (0.601)	-0.519 (0.595)
Year 2003	0.363 (1.437)	0.182 (1.199)	0.148 (1.160)
Year 2004	-0.241 (0.786)	-0.047 (0.954)	-0.064 (0.938)
Year 2005	0.924 (2.518)	-0.402 (0.669)	-0.155 (0.857)
Correction for Response Bias	-0.233 (0.792)	0.689* (1.992)	0.774** (2.169)
Level 2: Organizational Variables			
Size (Log Transformed)	0.122 (1.130)	0.000 (1.000)	0.161 (1.175)
Monthly Turnover (Log Transformed)	-0.575 (0.562)	-0.958 (0.384)	-0.866* (0.421)

* $p < .10$. ** $p < .05$. *** $p < .01$. **** $p < .001$.

Table 8. HLM Estimation Results: Contact with Legal Authorities at One-Year Postdischarge

Variables	Coefficient (Odds Ratio)		
	Child	Adolescent	Combined
Intercept	0.324	-0.088	-4.560
Level 1: Youth Variables			
Gender (Male)	0.250 (1.285)	0.550*** (1.734)	0.365** (1.441)
Race/Ethnicity (African American)	0.520 (1.682)	-0.144 (0.865)	-0.026 (0.974)
Age (in Years)	0.371*** (1.449)	-0.209*** (0.811)	0.136**** (1.145)
Antisocial Behaviors	0.528** (1.695)	0.437**** (1.548)	0.465**** (1.593)
Victim of Abuse/Neglect	0.045 (1.046)	-0.048 (0.953)	-0.044 (0.957)
Emotional Disorders	0.194 (1.215)	-0.056 (0.945)	-0.058 (0.944)
Count of Family Difficulties	-0.069 (0.934)	-0.086 (0.917)	-0.072 (0.931)
Length of Service (Log transformed)	-1.468 (0.230)	0.445 (1.561)	0.229 (1.257)
Primary Counselor	-0.249 (0.780)	-0.120 (0.887)	-0.113 (0.893)
Year 2001	0.422 (1.525)	-1.170*** (0.310)	-0.712** (0.491)
Year 2002	-0.796 (0.451)	-0.201 (0.818)	-0.423 (0.655)
Year 2003	-1.122* (0.326)	-0.492* (0.611)	-0.570** (0.566)
Year 2004	-2.631** (0.072)	-0.957*** (0.384)	-1.012**** (0.363)
Year 2005	-1.022* (0.360)	-0.427* (0.652)	-0.497** (0.608)
Correction for Response Bias	1.170** (3.223)	-0.370 (0.690)	-0.033 (0.967)
Level 2: Organizational Variables			
Size (Log Transformed)	0.411 (1.508)	0.108 (1.114)	0.169 (1.184)
Monthly Turnover (Log Transformed)	-2.030** (0.131)	-0.356 (0.701)	-0.630 (0.533)

* $p < .10$. ** $p < .05$. *** $p < .01$. **** $p < .001$.

were those who are older. Youth engaged in antisocial behavior also demonstrated significantly higher odds of having contact with legal authorities. Year of discharge was a significant predictor in the overall sample. Four of the dummy variables for time demonstrated a significant negative relationship with the odds of contact with legal authorities. Only the indicator for 2002 was not a significant predictor of odds of contact with legal authorities.

Among the child sample, in addition to age, anti-social behavior was a significant predictor of the odds of contact with legal authorities; youth engaged in anti-social behaviors had higher odds of contact with authorities. One of the indicators for time (Year 2004) was a significant negative predictor in the child sample for odds of contact with legal authorities, compared with the reference year of 2006, while two of the time indicators (2003 and 2005) were marginally negatively related to odds of contact with legal authorities. Mean monthly turnover was significantly negatively related to the odds of contact with legal authorities, indicating that youth served in offices with higher turnover had a lower odds of contact with legal authorities. The correction factor for response bias was a significant positive predictor of odds of contact with legal authorities.

Unlike both the overall and the child sample, age was a significant negative predictor of odds of contact with legal authorities in the adolescent sample. The differing signs between the child and adolescent samples suggest that older youth in the child group and those at the younger end of the adolescent group are significantly more likely to have contact with legal authorities by one-year postdischarge. In addition to age, gender was an important predictor of odds of contact with legal authorities among adolescents. Males were significantly more likely to have such contact relative to females. Antisocial behavior also significantly predicted increased odds of contact with legal authorities; no other clinical characteristics were found to predict such contact. Two of the time indicators (2001 and 2004) both significantly predicted decreased odds of contact with legal authorities compared with the reference year (2006), while indicators for 2003 and 2005 were marginally negative predictors. Variables related to the family, characteristics of program participation, and office characteristics were not significant in predicting odds of contact with legal authorities among adolescents.

4.3.4 Predictors of Out-of-Home Placements

The first outcome, placement with family, examined the placement of youth at the time of the one-year follow-up; youth were determined to be either placed with family or placed in a restrictive setting. The outcome, 'out-of-home placements', was coded 1 if youth had been placed out of the home in a residential treatment center, psychiatric hospital, or juvenile detention or correctional facility at any time in the previous six months.

As shown in Table 9, gender, antisocial behavior, length of service, and history of family difficulties were all significant predictors of out-of-home placements. Males were more likely to experience placements, as were those who reported antisocial behaviors. Length of service was positively related to out-of-home placement, indicating that longer length of service was associated with increased odds of an out-of-home placement. History of family difficulties was a significant, negative predictor of out-of-home placement; as number of family difficulties increased, out-of-home placements

Table 9. HLM Estimation Results: Out-of-Home Placement during Follow-up Period

Variables	Coefficient (Odds Ratio)		
	Child	Adolescent	Combined
Intercept	-9.837***	-3.136	-6.126***
Level 1: Youth Variables			
Gender (Male)	0.258 (1.294)	0.539*** (1.715)	0.434*** (1.544)
Race/Ethnicity (African American)	-0.445 (0.641)	0.029 (1.029)	-0.125 (0.882)
Age (in Years)	0.088 (1.092)	-0.152** (0.859)	0.027 (1.027)
Antisocial Behaviors	0.228 (1.256)	0.332*** (1.393)	0.302*** (1.352)
Victim of Abuse/Neglect	0.137 (1.146)	-0.129 (0.879)	-0.008 (0.992)
Emotional Disorders	0.190 (1.209)	-0.016 (0.984)	0.008 (1.008)
Count of Family Difficulties	-0.0275** (0.760)	-0.092 (0.912)	-0.150** (0.861)
Length of Service (Log Transformed)	1.611** (5.007)	0.601 (1.825)	0.755** (2.128)
Primary Counselor	-0.266 (0.766)	0.159 (1.173)	0.018 (1.018)
Year 2001	-0.948 (0.388)	-0.688 (0.503)	-0.731* (0.482)
Year 2002	-1.304** (0.271)	0.160 (1.174)	-0.222 (0.801)
Year 2003	-0.412 (0.662)	0.260 (1.297)	0.049 (1.050)
Year 2004	-0.482 (0.618)	0.023 (1.023)	-0.135 (0.874)
Year 2005	-0.502 (0.605)	0.389 (1.476)	0.059 (1.061)
Correction for Response Bias	-0.877** (0.416)	-0.247 (0.781)	-0.349 (0.706)
Level 2: Organizational Variables			
Size (Log Transformed)	-0.113 (0.893)	-0.197 (0.822)	-0.177 (0.838)
Monthly Turnover (Log Transformed)	0.988 (2.687)	0.491 (1.635)	0.567 (1.763)

* $p < .10$. ** $p < .05$. *** $p < .01$. **** $p < .001$.

decreased. One of the time indicators (2001) was a marginally significant negative predictor of out-of-home placement.

For the child sample, number of family difficulties was a significant, negative predictor of out-of-home placements, as was the time indicator for 2002. Length of service was significantly positively related to out-of-home placement, indicating that longer length of service was predictive of higher odds of out-of-home placement. None of the demographic, clinical, or office level variables were predictive of out-of-home placement for the child sample. The correction factor for response bias was significantly negatively related to odds of out-of-home placement.

Three variables significantly predicted out-of-home placement in the adolescent sample; males were more likely to experience out-of-home placements, as were adolescents with antisocial behaviors, while the odds of placement decreased with increasing age. None of the other clinical characteristics were significant predictors; office-level characteristics, family characteristics, variables associated with program participation, and time indicators did not significantly predict this outcome.

4.3.5 Predictors of Composite Outcome Measure

The composite outcome measure summarized the previous four outcomes and was coded in three categories. Youth who had a *Desirable* composite outcome were those who were living at home with family at one-year postdischarge, had no contact with legal authorities, made educational progress, and had no out-of-home placements in the previous six months. A *Mixed* composite outcome was defined as youth living at home with family, but who had one of the following conditions: had contact with legal authorities, was not making educational progress, or had an out-of-home placement. A *Negative* composite outcome was assigned to all youth who were not living with family at the one-year postdischarge follow-up, regardless of the status of the other indicators.

As discussed in the description of the model estimation (section 3.5.3) the results for the composite outcome measure include an additional parameter, which is necessary due to the ordinal nature of the measure. Table 10 includes the coefficients for D, which represents the difference in log odds of a desirable outcome and the log odds of a desirable or mixed outcome. Both options are compared to the reference group, which in this case is the undesirable outcome. Thus, in all three samples, the difference between log odds of a desirable outcome and those of a desirable or mixed outcome were significantly different than zero. As with the intercept, this coefficient provides little information in itself, but would be essential in computing log odds under various values of each of the covariates.

Echoing many of the earlier findings, gender, age, antisocial behavior, and length of service were found to be predictive of the composite outcome measure in the combined sample (see Table 10). Males were less likely to achieve a desirable composite outcome, as were those engaged in antisocial behavior. As age increased, the odds of a desirable outcome decreased. The same relationship was true for length of service, which was a significant negative predictor of desirable composite outcome. Victims of abuse/neglect were marginally less likely to achieve a positive composite outcome. The correction factor for response bias was a significant positive predictor of a desirable composite outcome.

Table 10. HLM Estimation Results: Composite Outcome Measure

Variables	Coefficient (Odds Ratio)		
	Child	Adolescent	Combined
Intercept	8.524***	2.640	5.960****
D	0.646****	1.147****	0.982****
Level 1: Youth Variables			
Gender (Male)	-0.045 (0.956)	-0.430*** (0.651)	-0.278** (0.757)
Race/Ethnicity (African American)	-0.030 (0.971)	0.042 (1.043)	0.031 (1.031)
Age (in Years)	-0.091** (0.913)	0.056 (1.057)	-0.070*** (0.933)
Antisocial Behaviors	-0.331** (0.718)	-0.345**** (0.708)	-0.326**** (0.722)
Victim of Abuse/Neglect	-0.053 (0.948)	-0.090 (0.914)	-0.099* (0.906)
Emotional Disorders	0.038 (1.038)	0.012 (1.012)	0.046 (1.048)
Count of Family Difficulties	0.071 (1.074)	0.023 (1.024)	0.041 (1.042)
Length of Service (Log Transformed)	-1.488*** (0.226)	-0.642** (0.526)	-0.960**** (0.383)
Primary Counselor	-0.192 (0.825)	0.142 (1.153)	0.029 (1.029)
Year 2001	0.181 (1.198)	0.387 (1.473)	0.282 (1.326)
Year 2002	0.236 (1.267)	-0.446* (0.640)	-0.278 (0.758)
Year 2003	0.088 (1.092)	-0.014 (0.986)	0.051 (1.052)
Year 2004	0.099 (1.104)	0.127 (1.135)	0.133 (1.142)
Year 2005	0.416 (1.516)	-0.163 (0.850)	0.025 (1.026)
Correction for Response Bias	0.821*** (2.273)	0.382 (1.465)	0.557*** (1.745)
Level 2: Organizational Variables			
Size (Log Transformed)	0.208 (1.231)	-0.010 (0.990)	0.091 (1.095)
Monthly Turnover (Log Transformed)	0.010 (1.010)	0.075 (1.077)	0.073 (1.076)

* $p < .10$. ** $p < .05$. *** $p < .01$. **** $p < .001$.

For the child sample age, antisocial behavior and length of service were significant predictors of composite outcome; both were associated in a negative direction with the odds of a desirable composite outcome. The correction for response bias was a significant positive predictor of odds of a positive composite outcome. Neither history of family difficulties nor office-level indicators were significantly predictive of composite outcome.

In the adolescent sample, the most important predictors of the composite outcome were gender and antisocial behavior, with males and those with antisocial behaviors having lower odds of a desirable outcome. Length of service was negatively related to the composite outcome. One of the time indicators (2002) had a marginally significant, negative relationship to odds of a positive composite outcome.

4.3.6 Marginal Impact Analysis

In order to facilitate interpretation of the information presented in the previous tables, marginal impact analysis was performed on the log-transformed variables (office size, mean monthly turnover, and length of service). Table 11 provides a baseline probability, evaluated at the sample means, for each binary outcome and each sample. Probabilities were calculated for an increase of 30 days in length of service, an increase in 50 cases in office size, and a decrease of 1% in turnover rate; all changes were relative to the sample means.

In the child sample, an increase of 30 days above the mean length of service resulted in a decrease in the probability of placement with family from .7487 to .6727 ($p < .01$), and in the combined sample decreased the probability of placement with family from .9068 to .8879. Length of service also impacted the probabilities of contact with legal authorities and out-of-home placements in the child sample, with 30 additional days of service beyond the mean increasing the probability of negative outcomes. In the adolescent sample, only the probability of educational progress was significantly affected by length of service, which decreased from .9963 to .9952.

Mean monthly turnover was marginally related to probability of educational progress in the combined sample. A decrease of 1% in the mean monthly turnover rate was predicted to increase the probability of educational progress from .9987 to .9991. Office size was not found to have a significant impact on any of the outcomes.

4.4 Summary of Findings

Demographic variables played an important part in predicting long-term outcomes both for children and adolescents. Gender and age were found to be significant predictors for each of the outcomes in at least one of the samples, while race was not a predictor of any of the outcomes. Adolescent males were found to have significantly lower odds of placement with their family, higher odds of contact with legal authorities and out-of-home placement, and lower odds of a positive composite outcome than adolescent females. While age was a significant predictor in the overall sample on only three of the outcomes (contact with legal authorities, educational progress, composite outcome), it was significant in predicting either child or adolescent status on

Table 11. Marginal Impact Analysis

	Baseline Probability Evaluated at Sample Means	Probability of Indicated Outcome with Increase of 30 days in LOS	Probability of Indicated Outcome with Increase of 50 cases in Size	Probability of Indicated Outcome with Decrease of 1% in Turnover
Child Sample				
Placement with Family	0.7487	0.6727***	0.7543	0.6977
Educational Progress	0.9986	0.9988	0.9986	0.9990
Contact with Legal Authorities	0.0048	0.0064**	0.0045	0.0022
Out-of-Home Placement	0.0010	0.0014**	0.0010	0.0007
Adolescent Sample				
Placement with Family	0.8570	0.8515	0.8571	0.8569
Educational Progress	0.9963	0.9952**	0.9963	0.9974
Contact with Legal Authorities	0.4175	0.3949	0.4138	0.3850
Out-of-Home Placement	0.0071	0.0081	0.0069	0.0059
Combined Sample				
Placement with Family	0.9068	0.8879***	0.9077	0.9056
Educational Progress	0.9987	0.9983**	0.9987	0.9991*
Contact with Legal Authorities	0.2650	0.2558	0.2604	0.2211
Out-of-Home Placement	0.0049	0.0057**	0.0048	0.0040

* $p < .10$. ** $p < .05$. *** $p < .01$. **** $p < .001$.

all five outcomes. In addition, the direction of the relationship differed for the child and adolescent samples for all five outcomes. In each case, those most at risk for negative outcomes were older youth in the child sample and younger adolescents.

Among the clinical characteristics, only antisocial behavior was a consistent predictor of long-term outcomes. This factor was a significant predictor for all five of the outcomes in both the adolescent and overall samples, and was predictive for three of the outcomes (contact with legal authorities, educational progress, and composite outcome) in the child sample. In every instance, a higher level of antisocial behavior was predictive of higher odds of negative outcomes. In the combined sample, victim of abuse/neglect was a significant predictor of placement with family and a marginally significant predictor of the composite outcome measure, while emotional difficulties was marginally predictive of placement with family in the child sample only.

Length of service also seemed to play an important role in predicting outcomes at one-year postdischarge for all outcomes except contact with legal authorities. In each case, longer lengths of stay were associated with higher odds of a negative outcome. Having a primary counselor did not significantly predict any outcome and was marginally associated only with placement with family in the child sample.

History of family difficulties, including mental illness, legal involvement, domestic violence, and substance abuse, was significantly predictive of out-of-home placements both in the child and combined samples. In both samples, a higher number of family difficulties was associated with lower odds of out-of-home placement. This variable did not appear to significantly predict any other outcome in any of the three samples.

The office-level characteristics (size and mean monthly turnover) were not significant predictors in most of the models. Turnover was significantly predictive of contact with legal authorities in the child sample and marginally associated with educational progress in the adolescent and combined samples. Increased turnover was associated with decreased likelihood of contact with legal authorities in the child sample, while increased turnover was associated with decreased likelihood of educational progress in the combined sample. Office size was not significantly related to any of the outcomes.

The correction factor for response bias was significantly associated with every outcome in at least one of the samples. This variable significantly predicted three outcomes for the combined sample (placement with family, educational progress, composite outcome) and four of the outcomes for the child sample (placement with family, contact with legal authorities, out-of-home placements, composite outcome), but was only marginally associated with one outcome (educational progress) in the adolescent sample.

CHAPTER 5: DISCUSSION

5.1 Integration of Findings

Contrary to the first hypothesis of this study, client characteristics were generally found to be more important predictors of long-term outcomes following intensive in-home services (IIHS) than were program activities or organizational characteristics. Support was found for the second hypothesis, in that youth level characteristics consistently had a stronger impact on the adolescent sample than on the child sample. The findings point to the importance of strengthening program models to address specific client-level risk factors for negative outcomes at one-year postdischarge, particularly for adolescents receiving IIHS.

Findings reported in the literature regarding the relationship between age and outcome following IIHS have been mixed: most of the studies examining MST have not found a role for most demographic characteristics in predicting outcomes (Borduin et al., 1995; Henggeler et al., 1992; Schaffer & Borduin, 2005), yet Barth et al. (2007a) found increasing age to be a significant predictor of contact with juvenile authorities at one-year postdischarge from IIHS. The current study finds age to be a consistent predictor across all five outcomes; in the combined sample, the relationship is consistent with Barth et al.'s finding of a positive relationship between age and negative outcomes. The picture becomes more interesting however, when the child and adolescent samples are examined separately.

The importance of youth's age in predicting the odds of positive outcomes was particularly worthy of note as the direction of the relationship was opposite for the child and adolescent samples. For all five outcomes, the older youth in the child sample and the younger youth in the adolescent sample were at highest risk of negative outcomes. This finding is not inconsistent with recent work suggesting that the transition between childhood and adolescence is a vulnerable time for youth, particularly in the area of social competence (Obradovich, van Dulmen, Yates, Carlson, & Egeland, 2006). Other researchers have identified nonlinear relationships between youth age and outcomes (Battin-Pearson et al., 2000; Natsuaki, Ge, & Wenk, 2008) pointing to the possibility that during certain periods, needs may be particularly acute and effective treatment may be especially elusive.

Length of service was consistently found to be predictive of negative outcomes, potentially leading one to question the effectiveness of services, as more service was associated with higher odds of negative outcomes. It is possible, however, that length of service was highly correlated with the risk and/or complexity of the case and that those constructs were not adequately captured by other explanatory variables. In addition, while clinical assessments provided a rich source of data for this study, a standardized assessment that could provide a more robust measure of the risk and protective factors of youth receiving services would be a welcome addition to the complement of data available from this provider. A standardized tool would allow for a more thorough investigation of the nature of the relationship between length of service and outcomes by permitting adequate risk adjustment.

5.2 Implications of Findings for Improving Services

Based on these findings, the IIHS program in the study agency is most likely to improve the long-term outcomes for youth served if they focus their energies on high-risk clinical characteristics, rather than changing organizational attributes such as size and turnover. Although a high rate of turnover is usually associated with increased expenditures for recruiting, hiring, and training, in this study turnover was not associated with higher odds of negative outcomes. Thus, finding more effective ways to treat antisocial behavior, particularly in males ages 10 to 16, may be the activity most likely to secure a higher odds of positive outcomes for youth served by the program.

5.2.1 Program Modifications Based on Child Characteristics

The variables most consistently associated with higher odds for negative outcomes were gender, age, and presence of anti-social behaviors. These findings suggest that the agency should strengthen the program model for youth with the highest-risk characteristics, including males, those ages 10 to 16, and those presenting with anti-social behavior. There may be several options that the agency can explore to improve outcomes for this group, including adopting interventions that specifically target reduction of anti-social behaviors, increasing monitoring and supervision of cases that present with all identified high-risk factors, and adopting or developing a reliable tool to identify the highest-risk cases at admission with the intention of providing more intensive services in those cases.

In addition to focusing on the demographic and clinical characteristics that seem to put youth most at risk for negative outcomes (male, age 10 to 16, with antisocial behaviors), the other factor that repeatedly displayed a significant predictive relationship with odds of positive outcome was length of service. The direction of the relationship was not, however, what might be expected. Longer lengths of stay tended to predict higher odds of negative, rather than positive, outcomes. This finding seems contradictory to the psychotherapy literature cited by Lindsey, Martin, & Doh (2002) that posited a well-established positive relationship between length of services and outcomes. While it has already been suggested that length of service may be highly correlated with case risk and/or complexity, there may be interventions available to the agency that might address some of the increased risk of negative outcomes associated with longer length of service. For example, intensive assessment of barriers to program completion (which occurs at the time of treatment goal attainment) may uncover unstable family environments or other challenges that need specific interventions. In addition, increasing utilization review and supervision on cases that extend beyond a target length of service may be an effective measure in reducing negative outcomes associated with longer stays.

5.2.2 Importance of Organizational-Level Findings

Contrary to expectations based on previous studies (Bruns et al., 2006), organizational structure was found to have only a minimal impact on long-term outcomes. Reasons for the lack of support for the relationship between organizational structure and long-term outcomes may be twofold. First, previous studies did not utilize multilevel models, potentially distorting the underlying relationships. Second, most work in this

area has been focused on the relationship of organizational structure to quality of service delivery, consumer satisfaction, and/or staff satisfaction, rather than long-term outcomes achieved by those receiving services from the organization. Size and turnover may well be related to the quality of service and/or satisfaction with the organization, but may have a different relationship to long-term outcomes.

This study made two important contributions in examining organizational factors related to long-term outcomes of behavioral health treatment. First, administrative data were used to measure organization-level constructs (size and turnover). Much of the extant literature on organizational impacts focuses on organizational climate rather than structure. Most measures of organizational climate involve surveys of employees at various levels of the organization (front-line staff, supervisors, administrators). These measures are rarely part of the organization's usual business processes and may be costly or inconvenient to collect. Administrative data, on the other hand, may be more readily available, both to organizations that desire to improve their services and to researchers wanting to examine specific questions regarding behavioral health service delivery. Although the two measures included in this study, size and turnover, did not prove to be particularly important in predicting positive outcomes, there may be other organizational-level measures found in administrative data that impact long-term outcomes. Such measures as leadership retention, training hours, and level of staff experience may demonstrate usefulness in explaining the variance in outcomes among offices.

The second contribution made by this study was to recognize the hierarchical structure of data gathered from multiple sites. While multilevel modeling is becoming increasingly utilized in studies of the delivery of behavioral health services, it is essential that studies take into account the lack of independence among observations gathered from a common setting, such as an office. Accurately describing the hierarchical structure of data, including nesting within individual counselors or nesting within teams, is critical in organizing the data and modeling the impact of the various levels on the outcomes of interest. With the increasing availability of statistical packages that accommodate hierarchical data, providers with adequate administrative data may be able to implement structured examination of research questions that are important to their quest for continuing program improvement using tools that appropriately account for the nesting in their data.

5.3 Study Limitations

5.3.1 Sample Selection

One of the most challenging aspects of conducting health services research is often the identification of appropriate data sources. This study was no exception. While the rich data resources of the agency were a substantial benefit in this case, challenges in working with the data remained. The most significant barrier to the use of these data to answer the study question was that 40% of the youth were missing data on one-year postdischarge outcomes. This necessitated substantial work to uncover and adequately address the potential response bias that existed due to significant differences between the respondents and non-respondents. Although the utilization of a probability score to correct for at least a portion of the potential bias was an acceptable solution, the

existence of such a large non-respondent pool raises some question about the generalizability of the findings to the universe of youth served by this agency. Further, the attempt to correct for response bias was, at best, only partially effective, as the relationship between the correction factor and the probability of positive outcomes was not consistent in direction or significance across either outcomes or samples. Substantial effort needs to be committed to accurately assessing the nature of the bias among respondents so that a reasonable correction factor can be applied in future studies.

At least two possibilities exist to improve the ability of this agency's data to answer research questions such as the one posed by this study. First, steps must be taken to increase the response rate, particularly among youth who are currently underrepresented in the respondent pool. African-American youth and those discharged to a restrictive setting should be the focus of particularly intensive efforts, as they are currently underrepresented among responders. A second possibility is to explore other methodological techniques for identifying and correcting the potential response bias. This is a particularly important step if future studies wish to use the historical data available from this agency.

5.3.2 Inclusion of Counselor-Level Data

This study was originally conceived as a three-level model, having clients nested within counselors and counselors nested within offices. Careful examination of the data revealed two facts that precluded use of such a model. First, only 22% of clients were served by a single counselor. In this program, that is not particularly unexpected, as the team structure employed by the agency allows for supervisors or team members to provide services to families when a counselor is unavailable. If such sharing of cases among team members were the only factor at work, then it would be a fairly simple matter to determine a 'primary counselor' in each case by identifying the counselor who conducted the largest percentage of family sessions and/or who made the largest percentage of collateral contacts on a case.

The level of turnover within the agency points to another reason that youth are served by multiple counselors. When a counselor leaves, the case must be passed to someone else. This level of turnover also creates a situation in which counselors may move fairly quickly into a supervisory role; when promotions happen, cases often are reassigned, particularly if they are not expected to discharge in the immediate future. The identification of a primary counselor is somewhat more challenging in this environment. In fact, only 73.5% of youth had a single counselor who conducted at least 75% of the family sessions; 26.5% of the youth not only had multiple counselors, but their primary counselor conducted less than 75% of the family sessions. This brings into question the wisdom of even attempting to view cases as nested within counselors. A more appropriate structure for the data may be to view youth as nested with teams, which are, in turn, nested within offices. With the currently available data, it is not possible to accurately determine team assignment. Future studies conducted at this agency may well benefit from inclusion of information at the team level.

5.3.3 Fidelity Measure

For most of the study period, the agency's IIHS program was licensed as an MST provider. While MST has a well-developed fidelity measure, data from that measure was not available for this study. This measure would also have provided some sense of the extent to which families were engaged and aligned with the counselor and the program. The therapeutic alliance has been cited as a predictor of decreases in referral behaviors (Hogue et al., 2006; Hogue et al., 2008; Samstag et al., 1998) and may be an important covariate in the model to explain long-term outcomes. Given the relationship that has been established between Therapist Adherence Measure scores and outcomes specifically (Henggeler et al., 1997; Schoenwald, Ward et al., 2000), and between the concept of therapeutic alliance and symptom reduction in general, the absence of such data in this study represents a significant limitation.

5.3.4 Availability of Appropriate Data

Lack of a data on a broad range of family characteristics limited the options for exploring the impact of the family on long-term outcomes. Reliable data on income, employment, education, housing stability, and receipt of other social services would provide a richer environment in which to examine questions regarding the connections between family characteristics and long-term outcomes for youth.

While the data utilized in this study was relatively abundant in clinical information, several issues could not be addressed with the available data. Duration, intensity, setting, and effectiveness of prior mental health treatment was not available for this sample; also missing were data concerning current or past psychotropic medication utilization, compliance with prescribed medications, and effectiveness of medications. Another deficit in the data was a lack of any standardized measure of youth and/or family risk or functioning. Such a measure, particularly if it were available as a pre-post measure would represent a significant improvement in the quality of the measures. Although the clinical data and behavioral outcomes are important, the ability to compare standardized measures across time within individuals and across units within the organization would substantially enhance this work.

Primary data from juvenile authorities and schools concerning the outcomes of interest would be another significant addition to any future studies in this area. Specifically, frequency, timing, and outcomes (disposition) of contact with legal authorities would provide a substantially superior measure than the parental- or self-report available in this study. Data on school attendance, truancy, school performance, suspensions and expulsions would allow for a much deeper exploration of the impact of services on educational progress. Such information is notoriously difficult to obtain, even under the best of circumstances; ongoing receipt of school data, even from a limited sample, is unlikely to occur. Although the logistical complexity of data collection from multiple entities that have little incentive to provide such information is daunting, at best, such primary data would provide a more reliable source of information than the currently-used self-report from parents, youth, and/or caseworkers for custodial agencies.

The availability of more appropriate outcome measures for the child sample could provide a clearer understanding of the impact of services on this group. Even for children with serious behavioral or emotional disorders, contact with legal authorities and

placements outside the home are rare. In addition, most children, regardless of their mental health status, are in school. For pre-adolescent youth, measures of academic progress and conduct grades would offer substantially more information on the impact that IIHS had on the long-term functioning of youth. In addition, standardized measures of aggression toward peers and/or family members would allow for a determination of the extent to which IIHS addressed these issues.

The development of valid and reliable data collection and analysis tools that utilize existing agency records would provide a powerful mechanism to evaluate the impact of services and to guide program improvement. Such tools must be sensitive to the criticisms of much of the extant research on IIHS and must draw on the best available methodological practices in creating both data collection and analysis processes. While critiques of case records are valid, such administrative files remain a rich source of data, often including multiple perspectives (child, family, counselor, caseworker), both standardized and qualitative assessments, detailed data concerning type, quantity, and duration of services, and outcome data, both at program discharge and at follow-up points beyond the end of services. Given the importance of determining factors that influence long-term outcomes following IIHS, the data from agency case records should be mined for information that can contribute to understanding this critical issue.

5.3.5 Interactions, Linearity, and Confounding Factors

Substantial work was required to uncover and attempt to control for the interrelated nature of many of the variables in this study. As the conceptual framework indicates, these outcomes do not occur in a vacuum, but, rather, within a complex and interconnected web of relationships, structures, resources, and personal histories. The overlap between, for example, the clinical characteristics of youth were considerable, but less than straightforward. While the use of principal components analysis to distill a large number of variables into a manageable complement of concepts, alternative approaches to reducing multicollinearity may be more productive, both in terms of untangling the relationships among the predictors and more clearly demonstrating the associations that exist among the variables at multiple levels.

The demonstrated relationship between age and outcomes also points to the need to examine the possibility that even within the child and adolescent samples, age may have a non-linear relationship to the odds of positive outcomes. A more sophisticated inspection of the true dimensions of that relationship may be warranted. In addition, interactions among the various predictors, such as age and gender, or age and clinical characteristics, may be masking the true relationships between the predictors and outcomes. A thorough examination of these issues is likely to require substantially larger samples than were available in this study.

Although multilevel modeling is a powerful tool, the limitations of the HLM program may have impacted the ability to discover the true relationships between the multilevel factors under consideration. Given the sample size, it was not possible to obtain a convergent random effects model. It was assumed that youth level characteristics did not vary significantly by office, but this may not be the case. In addition, the sample size and data structure precluded the exploration of interactions among key variables and of potential clustering by state or geographic region. Further

examination of the multilevel influences on outcomes may be more productively performed using alternative modeling techniques that adequately account for the hierarchical structure of the data but that provide more flexibility in model construction and variable inclusion.

5.4 Future Directions for Research

Two separate, yet equally important, lines of research could help to clarify the factors associated with long-term outcomes for youth following IIHS. The first involves the further development of sophisticated methodologies and analytic tools to more effectively utilize large administrative datasets from health care providers that include outcome data. The second is a more grounded approach, aimed at developing a useful protocol for incorporating powerful analytical tools into the business processes of behavioral health service providers for the purpose of improving services to children and families. Both avenues of inquiry are required to provide a more complete understanding of the outcomes of this type of behavioral health service and to put that understanding to use in improving services, and thus improving outcomes, for children and families.

The past decade has seen a substantial increase in the utilization of electronic medical records database systems in the field of mental health. As providers move to adopt systems that allow researchers more ready access to data, methodological tools need to be developed that make effective use of such data. Although mental health service providers are seldom able to implement random assignment experimental designs in order to determine the effectiveness of services, they increasingly have substantial evidence from ongoing outcome evaluation activities of the long-term impact of their programs on those they served. Researchers who avail themselves of this administrative data have the opportunity to answer important questions regarding the factors that impact the effectiveness of services. In addition, questions of optimal dosage, service array, provider characteristics, and administrative and financing mechanisms may well be answered by drawing on the wealth of provider-based administrative data that is developing across the country.

The other side of this research agenda involves the development of a practical protocol that can be utilized by providers to effectively learn from their administrative data in order to improve their services. With the increasing availability of electronic data resources, providers need powerful yet manageable tools to unlock information available from their administrative data. Included in the research agenda focused on the utilization of data for performance improvement would be questions regarding the types of information needed, the types of statistical tools necessary, and the types of data management required to accomplish increases in the likelihood of long-term positive outcomes for children and families. For agencies that already have the infrastructure necessary to collect long-term outcome data, and for those just implementing systems to gather outcome data, information on the most effective tools, techniques, and processes would be invaluable.

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APPENDIX A: PSYCHOSOCIAL ASSESSMENT

Client information at Youth Villages resides in an electronic medical database system, known as CDT. Information is gathered at intake, virtually continually while the child is in treatment, immediately after discharge, and at three follow-up points (six, twelve, and twenty-four months). The Psychosocial Assessment (depicted below) is gathered at intake and updated annually. The client depicted in these screen shots is fictitious.

The screenshot displays the 'Clinician's Desktop' application window. The main window is titled 'Psychosocial III' and contains a form for a psychosocial assessment. The form includes fields for Client ID (101184), Service Date (4/10/2001), Staff ID (AWY), and Info obtained from (Mr. and Mrs. Tester). It also has sections for Presenting issues/Behavioral Assessment, Comments about previous tx (Previous tx unsuccessful due to parental refusal to comply with recommendations), and Problem History. The Problem History section lists various issues with checkboxes, including Aggression, Alcohol Abuse, Anxiety, Assault, Depression, Drug Abuse, Fire-Setting, Gang Involvement, Hyperactivity, Oppositional, Psychosis, Runaway, Suicide Attempt, Suicidal Ideation, Theft, Truancy, Victim of Physical Abuse, Victim of Sexual Abuse, Victim of Neglect, and Other (explain below). The form is divided into tabs: Face Sheet, Mental Status Exam, Medical/Developmental History, Legal/Runaway History, and Alcohol/Drug I. The status bar at the bottom shows the file path 's12h/Database/Application Ad dba Apr 10, 2001 03:'.

Clinician's Desktop

File Edit View Reports Utilities Tools Window Help

Psychosocial III

Client ID: 101184 Test, Tester

Service Date: 4/10/2001

Staff ID: AWY Andrew, Yu, MS

Info obtained from: Mr. and Mrs. Tester

Presenting issues/ Behavioral Assessment

Comments about previous tx: Previous tx unsuccessful due to parental refusal to comply with recommendations

Problem History

☒ Aggression	☐ Drug Abuse	☐ Psychosis	☐ Truancy
☐ Alcohol Abuse	☒ Fire-Setting	☐ Runaway	☐ Victim of Physical Abuse
☐ Anxiety	☐ Gang Involvement	☐ Suicide Attempt	☐ Victim of Sexual Abuse
☐ Assault	☐ Hyperactivity	☐ Suicidal Ideation	☐ Victim of Neglect
☐ Depression	☐ Oppositional	☐ Theft	☐ Other (explain below)

Face Sheet Mental Status Exam Medical/Developmental History Legal/Runaway History Alcohol/Drug I

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Clinician's Desktop

File Edit View Reports Utilities Tools Window Help

Psychosocial III

Psychosocial III

Alertness:

Orientation:

Mood:

Affective range:

Speech:

Memory:

Attention/Concentration:

Impulse Control:

Judgement:

Insight:

Thought Content (Check all that apply)

☐ Compulsions ☐ Ideas of reference/influence ☐ Poverty of content

☐ Delusions ☐ Obsessions ☐ Preoccupations

☐ Guilt ☐ Paranoia ☐ Suicidal ideations

☐ Homicidal ideations ☐ Phobias ☐ NO SIGNIFICANT PATHOLOGY

Face Sheet Mental Status Exam **Medical/Developmental History** Legal/Runaway History Alcohol/Drug I

s12h/Database/Application Ad dba Apr 10, 2001 03:

Clinician's Desktop

File Edit View Reports Utilities Tools Window Help

Psychosocial III

Psychosocial III

MEDICAL/DEVELOPMENTAL HISTORY (Use token by hitting F7)

STD History Dx Date

Yes

Sexually active?

Ever pregnant?

Use protection?

Ever fathered?

Outcome of pregnancy

Height: Weight: Within normal limits?

Face Sheet Mental Status Exam **Medical/Developmental History** Legal/Runaway History Alcohol/Drug I

s12h/Database/Application Ad dba Apr 10, 2001 03:

Clinician's Desktop

File Edit View Reports Utilities Tools Window Help

Psychosocial III

LEGAL

☒ Prior legal charges ☒ Prior corrections
☒ Prior detention ☐ Currently on probation

Legal issues impact tx?

If yes, use token [F7] to enter details (REQ'D) ==> 12/12/00 assault and battery

RUNAWAY

Number of runaways

Runaway triggers Fights with parents and maternal uncle

Typical location run (from and to)

Face Sheet Mental Status Exam Medical/Developmental History Legal/Runaway History Alcohol/Drug I

s12h/Database/Application Ad dba Apr 10, 2001 03:

Clinician's Desktop

File Edit View Reports Utilities Tools Window Help

Psychosocial III

Psychosocial III

A/D use/addiction***	Longevity	Frequency	Last Use	Likelihood to continue

*Use as many as needed (select 'None' if no alcohol/drug use). However, fill each row completely.
 **Do not include prescription psychotropic medications unless taken in excess of prescribed amounts
 *** As of 10/01/03, all clients MUST be screened for absence of Nicotine and Caffeine. FILL ROWS 1 and 2

Mental Status Exam Medical/Developmental History Legal/Runaway History Alcohol/Drug History Educ

s12h/Database/Application Ad dba Apr 10, 2001 03:

Clinician's Desktop

File Edit View Reports Utilities Tools Window Help

Psychosocial III

Psychosocial III

EDUCATIONAL

Last grade completed

Parental monitoring/involvement

School Counselor involvement

Educational resources

[Significant Educational History](#)

VOCATIONAL (CLIENT)

Child employed?

Length

FAMILY INCOME

Employment status

Annual income

Sources of income

Legal/Runaway History Alcohol/Drug History Educational/Vocational History Social History Community

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Clinician's Desktop

File Edit View Reports Utilities Tools Window Help

Psychosocial III

Psychosocial III

FAMILY DYNAMICS/SOCIAL HISTORY (Use token by hitting F7)

FAMILY MAKEUP

Involved family?

[Family Members](#)

PEER RELATIONS

Age preference

Gender preference

Ease making friends

Maintains friends

Peer alcohol hx

Peer drug hx

Peer legal hx

Peer gang involv.

CLIENT GANG INVOLVEMENT

Gang involvement

Length of involv.

Gang Name

Legal/Runaway History Alcohol/Drug History Educational/Vocational History Social History Community

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Clinician's Desktop

File Edit View Reports Utilities Tools Window Help

Psychosocial III

Psychosocial III-Family Members

Last Name	First Name	Relationship*	Marital Status*	Employer
▶ tester	Josh	brother	n	not applicable

On navigatable grids, keep the following in mind:

- 1) After you reach the end of each line, CDT will automatically advance you to the next line. This will sometimes cause the line you just entered to "disappear". Click the REFRESH icon (clockwise arrow on the toolbar) to "retrieve" your entry.
- 2) Fields denoted with an asterisk (*) require that you select off the drop-down list. Pop up the list by hitting [F9].

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Clinician's Desktop

File Edit View Reports Utilities Tools Window Help

Psychosocial III

Psychosocial III-Family Members

	Educational Level*	Hx Alcoholism*	Hx Drug Use*	Hx Depression*	Hx Suicide Attempt*	Hx Psychosi:
▶ 3	No	No	Yes	Unknown	No	
0	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
0	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown

On navigatable grids, keep the following in mind:

- 1) After you reach the end of each line, CDT will automatically advance you to the next line. This will sometimes cause the line you just entered to "disappear". Click the REFRESH icon (clockwise arrow on the toolbar) to "retrieve" your entry.
- 2) Fields denoted with an asterisk (*) require that you select off the drop-down list. Pop up the list by hitting [F9].

s12h/Database/Application Ad j16s Jan 07, 2005 02

Clinician's Desktop

File Edit View Reports Utilities Tools Window Help

Psychosocial III

Psychosocial III-Family Members

Hx Suicide Attempt*	Hx Psychosis*	Hx Psychiatric Care*	Hx Legal*	Hx Domestic Violence*
Unknown	No	Yes	Unknown	No
Unknown	Unknown	Unknown	Unknown	Unknown
Unknown	Unknown	Unknown	Unknown	Unknown

On navigatable grids, keep the following in mind:

- 1) After you reach the end of each line, CDT will automatically advance you to the next line. This will sometimes cause the line you just entered to "disappear". Click the REFRESH icon (clockwise arrow on the toolbar) to "retrieve" your entry.
- 2) Fields denoted with an asterisk (*) require that you select off the drop-down list. Pop up the list by hitting [F9].

s12h/Database/Application Ad j16s Jan 07, 2005 02

Clinician's Desktop

File Edit View Reports Utilities Tools Window Help

Psychosocial III

Psychosocial III

ENVIRONMENT

Crime level

Community resources

WEAPONS

Weapons in home

Owner of weapon(s)

Ammunition kept separate?

Gun double-locked?

SPIRITUAL

Affiliation

Attends services

Place of worship

Use token [F7] to enter details (REQUIRED)

Alcohol/Drug History Educational/Vocational History Social History Community Summary and Recomm

s12h/Database/Application Ad dba Apr 10, 2001 03:

Clinician's Desktop

File Edit View Reports Utilities Tools Window Help

Psychosocial III

Psychosocial III

Summary and Recommendations*

Reunification plan 1

*REMINDER: Use [F7] to initiate token within Summary and Recommendations note section

Educational/Vocational History Social History Community Summary and Recommendations

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APPENDIX B: FOLLOW-UP SURVEY

Client Name _____ CDT # _____ Period _____
Episode _____

1. Is (*client name*) currently living with you? Yes No
If no – Where does (*client name*) currently reside? _____
2. Who has legal custody of (*client name*)? _____
3. Has (*client name*) lived or been placed outside of your home in the past *six/twelve* months?
Yes No
If Yes, list all _____

For the next few questions, please think about (*client name*)’s experience at school in the past 6 months.

4. Has (*client name*) been attending school? Yes No
If Yes, skip to question 5.
If No, ask the following questions as appropriate and skip questions 5 through 9:
 - a. Did (*client name*) graduate from high school? Yes No
 - b. Did (*client name*) receive a GED? Yes No
 - c. Is (*client name*) enrolled in GED classes? Yes No
5. What are (*client name*)’s current grades? Would you say mostly
A’s (4.0) B’s (3.0) C’s (2.0) D’s (1.0) F’s (0.0)
6. On a scale from 0 to 4 with 0 being “a lot of trouble” and 4 being “no trouble,” how much trouble does (*client name*) have getting *his/her* homework done? _____
7. On a scale from 0 to 4 with 0 being “doesn’t get along at all” and 4 being “gets along well with teachers,” how does (*client name*) get along with *his/her* teachers? _____
8. Has (*client name*) been suspended (Yes No) or expelled (Yes No)?
9. Has (*client name*) been absent more than 5 times in the last marking period? Yes No

In addition to (*client name*)’s involvement at school, I’d like to ask a few additional questions about *his/her* involvement in the community.

10. Has (*client name*) been in trouble with the law/legal system during the past 6 months? Yes No
If Yes, explain _____
11. In the past 6 months, has (*client name*) received any of the following services?
(*Ask each row until they either say Yes or you have asked all three rows*)

Mental health clinic, outpatient counseling, or in-home counseling?	Yes	No
Psychologist, psychiatrist, or medication management?	Yes	No
School counselor or day treatment?	Yes	No

If Yes to any of the above ask the following:
Has (*client name*) received these services on a regular basis? Yes No

If client is 16 or older ask the following:

12. In the past 6 months has (*client name*) been working?
Full-time Part-time Seeking employment No

If client is 14 or older ask the following:

13. (*For females only*) Is (*client name*) currently pregnant? Yes No
14. (*For all clients*) Is (*client name*) responsible for parenting a child? Yes No

jms

12/14/07

VITA

Sarah Hurley was born in 1959 and has been married for nearly 25 years to George Lord, Ph.D. Together, they parented five children. She has worked in the field of health care for more than 20 years. Following graduation from the University of Memphis with a Master's in Sociology, she has worked in a variety of capacities and geographic locations. She began her career in the Biostatistics Division at Baptist Memorial Hospital in Memphis, Tennessee. She held several positions at the Ohio Department of Health, including Primary Care Planner and Research Analyst. She taught at the undergraduate level for twelve years, offering courses in Research Methods, Social Statistics, Complex Organizations, Introductory Sociology, and Freshman Experience at The University of Michigan-Flint, Pittsburg State University, and Arkansas State University. She also served as Interim Executive Director of an AIDS service organization.

In her current position as Director of Research at Youth Villages, Ms. Hurley is responsible for the management of research and outcome evaluation activities for a large not-for-profit behavioral health service provider, serving children and families through a continuum of care in 10 states and the District of Columbia. Duties include supervision of research staff of 15 professionals, management of the outcome evaluation process that tracks all children discharged from the organization two years postdischarge, development of end-user reporting capabilities within SQL-based electronic medical records database system using Crystal Reports, analysis of outcome data using SPSS and SAS, creation of proposals for grant funding, management of funded research projects, development of policy recommendations based on analysis of outcome data, presentation of research results to multiple audiences including leadership staff, policymakers, state and local organizations, and national conferences.

In 2007, Ms. Hurley co-authored three studies with Dr. Richard Barth and his research team. The papers appeared in *Children and Youth Services Review* (v. 29), *American Journal of Orthopsychiatry* (v. 77) and *Research in Social Work Practice* (forthcoming). She has also made numerous presentations at national conferences, including three at the annual Systems of Care Conference sponsored by the University of South Florida, Louis de la Parte Florida Mental Health Institute, Research and Training Center for Children's Mental Health. Her plans following graduation from the University of Tennessee Health Science Center are to continue and expand her work at Youth Villages in order to improve services for youth with behavioral disorders.