

**The Pennsylvania State University
The Graduate School
College of Health and Human Development**

**MALTREATED CHILDREN WITH MENTAL
HEALTH NEEDS: DOES COORDINATION
BETWEEN CHILD WELFARE AGENCIES AND
MENTAL HEALTH PROVIDERS IMPROVE THEIR
OUTCOMES?**

**A Thesis in
Health Policy and Administration**

**by
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ABSTRACT

The high prevalence of mental health problems among children in child welfare and the inadequate provision of mental health services for this subpopulation have been well documented. Calls for strengthening cooperation between child welfare and mental health agencies are derived from two pervasive assumptions. First, children without mental health problems had better experiences and outcomes than those with mental health problems. Second, more cooperation between child welfare and mental health agencies is needed to better serve vulnerable families. The body of evidence to support two assumptions, however, is sparse and even contradictory. In addition, few studies highlight what factors support more of such interagency coordination. This dissertation addresses these questions through a longitudinal analysis of a national sample.

This dissertation is composed of three studies. The first study examines whether mental health needs affect safety and permanency for children in child welfare. The second study investigates the role of the intensity of interorganizational relationships (IORs) between child welfare agencies and mental health providers in increasing mental health services use and improving psychological functioning. The third one explores organizational determinants of the intensity of IORs for child welfare agencies.

The first study evaluated the safety and permanency among children in the child welfare system with mental health needs and compared these outcomes with those of children without mental health needs. Longitudinal analyses drew on data from the National Survey of Child and Adolescent Well-Being (NSCAW). Proportional hazard models and Generalized Linear Models with sampling weights were used to identify the predictors of safety and permanency. Results indicated that having mental health needs

increased the risk of a new maltreatment report and decreased the likelihood of reaching permanency. Externalizing and internalizing patterns had different associations with safety and permanency. Policy implications include the need to assess mental health straight after intake of children and that coordination between child welfare agency and mental health providers should be strengthened.

The second study investigated whether IORs increase the use of mental health services and improve the mental health status for children served by child welfare system. This analysis was longitudinal involving 36 months follow-up data from the NSCAW. The sample consisted of 1,613 children within 75 child welfare agencies, who were 2 year old or above and had mental health problems at baseline. IOR intensity was measured as the number of coordination approaches between child welfare agencies and mental health providers. Weighted multilevel logistic regression model showed that agency level factors accounted for 14% of the variance in probability of service use and mental health improvement. Greater intensity of IORs was associated with higher likelihood of service use and mental health improvement. It was concluded that IORs were an effective means to improve children's well-being.

The third study sought to identify organizational and contextual factors associated with higher numbers of inter-agency ties. This study was cross-sectional with 86 child welfare agencies whose directors were interviewed through the NSCAW. Five organizational factors were investigated: the child welfare agency's scope of services, agency size, organizational affiliation, fiscal resources, and IORs with other types of child-serving agencies. IOR intensity was measured as the number of coordination approaches between child welfare agencies and mental health providers. Poisson

regression model revealed that greater number of IORs with the judicial system and schools significantly predicted high intensity of connections between child welfare agencies and mental health providers. Neither agency size, scope of child welfare agency services, expenditures, nor agency affiliation was associated with the number of ties with mental health providers. Child welfare agencies appear to cooperate more extensively with mental health agencies when they have a general affinity for cooperation. Agencies with more ties to other child-serving organizations might share strategies with their peers that encourage them to cooperate more actively as well.

In general, this dissertation extends previous research through the use of a nationally representative sample, a rich array of measures from multiple sources, appropriately sophisticated quantitative methodologies, and a systematic approach to very complex issues¹.

¹ These studies were approved by the Institutional Review Board at the Pennsylvania State University.

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CHAPTER ONE

Introduction

In 2004, approximately 872,000 children in this country experienced maltreatment (U.S. Department of Health and Human Services, Administration on Children, & Youth and Families, 2006). A disproportionately high prevalence of mental health problems (defined by a clinical range score of Child Behavior Checklist (CBCL) or by the diagnosis of DSM-IV) is found among children in the child welfare system, with estimates ranging from 37 to 78 percent (Clausen, Landsverk, Ganger, Chadwick, & Litrowink, 1998; Glisson, 1996; Hurlburt et al., 2004). In addition, the inadequate provision of mental health services for children in child welfare who have mental health problems has been well documented (Burns et al., 2004; Glisson, 1996; Hurlburt et al., 2004; Trupin, Tarico, Benson, Jemelka, & McClellan, 1993).

Due to the high prevalence of mental health problems among children in child welfare and the inadequate provision of mental health services for this subpopulation, a consensus is emerging in the field that better coordination between child-serving agencies is needed to improve access (New Freedom Commission on Mental Health, 2003). Calls for strengthening such cooperation are derived from two pervasive assumptions. The first is that children without mental health problems would have better experiences and outcomes (e.g., safety, permanency, and wellbeings) than those with mental health problems. The second assumption is that more cooperation between child welfare and mental health agencies would better serve vulnerable families. The body of evidence to

support two assumptions, however, is sparse and even contradictory. In addition, few studies highlight what factors support more of such interagency coordination.

Safety and permanency for maltreated children with mental health needs

Safety, permanency, and well-being are the ultimate goals of child welfare system for abused and neglected children (U.S.DHHS, 2002). They are not only key tasks for child welfare professionals but also the main outcome measures by which policy makers often track the performance of the child welfare system. Abuse, neglect, and impermanence (e.g., lengthen stays in foster care and frequent placement changes) adversely affect children's psychosocial development (Jaffee, Caspi, Moffitt, & Taylor, 2004; Newton, Litrownik, & Landsverk, 2000; Rogosch & Cicchetti, 2004); and such effects may extend into adulthood (Colman & Widom, 2004; Lansford et al., 2002; Spataro, Mullen, Burgess, Wells, & Moss, 2004).

Despite strong evidence that maltreatment affects children's outcomes, there are still major unanswered questions about how this unfolds and when and how to best intervene. One critical question for child welfare policy makers is how much children's baseline mental health may affect subsequent safety (i.e., freedom from re-abuse) and permanence (i.e., reunification/adoption, short stay in out-of-home settings, and few out-of-home placement changes).

Better understanding how mental health affects these key outcomes will help managers and policy makers make better decisions about where to invest resources to best serve children. Identifying factors affecting safety and permanency contributes to evidence-based interventions, which may reduce caseloads of foster care and kinship

care; and consequently, reduce the financial burden of out-of-home placements. Little evidence, however, exists as to whether and how children's mental health status affects safety and permanency over time.

Cooperation between child welfare agencies and mental health providers: does it has an effect on children's service use and outcomes?

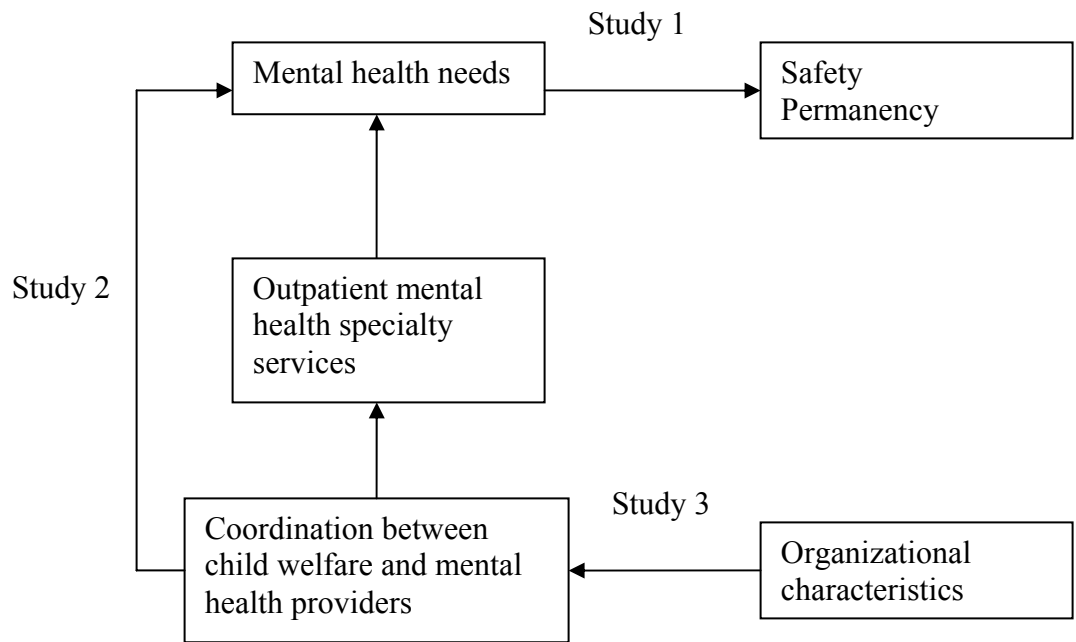
Although many child welfare children have mental health problems, the insufficient provision of mental health services for these emotionally disturbed children has been well documented (Burns et al., 2004; Glisson, 1996; Hurlburt et al., 2004; Trupin et al., 1993). Inadequate interorganizational relationships (IORs) between child welfare and mental health providers may partly account for the substantial gap between needs and use of mental health services (Child's Defense Fund, 2003; Halfon et al., 2002a; Halfon, Zepeda, & Inkelas, 2002b). Previous cross-sectional evidence suggests that active IORs may strengthen the relationship between mental health needs and use of mental health services (Hurlburt et al., 2004). But Hurlburt et al (2004) did not investigate the role of coordination in improving children's mental health because longitudinal data from other waves were unavailable at that time. Now additional data, from Wave 2 to Wave 4, allow us to examine the role of IORs in potentially affecting mental health over time. In addition, the degree of agency's effect was not evaluated in that study because the authors used a survey sample analysis instead of weighted multilevel modeling. Estimating the unique role of child welfare agency effect would contribute to further understanding interagency coordination.

Organizational factors impacting inter-organizational relationship

IORs across child serve agencies may reduce fragmentation in services, improve ability to meet specialized needs, address more choices in services, and improve access to services (Hodges, Nesman, & Hernandez, 1999). But currently interagency activities between child welfare and mental health agencies are recognized to be insufficient (Halfon et al., 2002a; Halfon et al., 2002b). Moreover, the findings of IORs' impact between child welfare and mental health agencies from previous studies are contradictory. The inconsistent findings raise questions of what types of IORs may enhance children's service access and outcomes and what agency attributes may affect its interorganizational activities. Intensity, or the number of different types of ties between a focal agency and its partner (Rogers & Whetten, 1982), is a logical candidate because agencies need to achieve complex coordination for vulnerable children and families. Investigating the relationship between organizational characteristics and intensity of IORs will contribute to better learning under which conditions such IOR characteristics are more likely to occur.

The purposes of this dissertation are to: (1) compare differences in safety and permanency between abused children with mental health needs and those without mental health needs, (2) examine whether coordination between child welfare agency and mental health providers can improve mental health service access and/or children's psychological functions, and (3) explore what organizational characteristics affect the interorganizational ties between child welfare agencies and mental health providers. Accordingly, this dissertation is comprised of three studies (Figure 1.1).

Figure 1.1 Dissertation structure



CHAPTER TWO

DO MENTAL HEALTH NEEDS AFFECT SAFETY OR PERMANENCE FOR CHILDREN IN THE CHILD WELFARE SYSTEM?

Abstract

A significant proportion of children in the child welfare system have mental health problems. However, little is known about the impact of those problems on the children's safety and permanence. This study compared these outcomes for children with and without mental health needs. Longitudinal analyses drew on data from the National Survey of Child and Adolescent Well-Being (NSCAW). Proportional hazard models and generalized linear models with sampling weights were used to test the degree to which mental health predicted safety and permanence. Results indicate that having mental health needs increased the risk of a new maltreatment report and decreased the likelihood of reaching permanence. Externalizing and internalizing patterns had different associations with safety and permanence. These findings highlight the need for children in the child welfare system to have prompt mental health assessment and adequate treatment services.

Key words: mental health needs; CBCL; reabuse; permanence; safety.

Background

In 2004, approximately 872,000 children experienced maltreatment (U.S. Department of Health and Human Services et al., 2006). Child welfare agencies pursue two sometimes competing goals for these children: safety and permanence (U.S.DHHS, 2002). Safety is defined as the protection of children from abuse and neglect. Permanence refers to stable and consistent living situations and continuity in family relationships and connections. Abuse and impermanence (e.g., long stays in foster care and frequent placement changes) adversely affect children's psychosocial development (Jaffee et al., 2004; Newton et al., 2000; Rogosch & Cicchetti, 2004). Such effects may extend into adulthood (Colman & Widom, 2004; Lansford et al., 2002; Spataro et al., 2004). Thus, avoiding both are not only key tasks for child welfare professionals but common outcome measures for those who track the performance of the child welfare system.

Children entering child welfare often have special needs such as mental health problems (Clausen et al., 1998; Glisson, 1996; Hurlburt et al., 2004). Compared to 20 percent among general pediatric population with clinical scores for the Child Behavior Checklist (CBCL) or DSM-IV diagnoses (U.S. Department of Health and Human Services, Administration on Children, & Youth and Families, 1999), estimates for children in the child welfare system range from 37% to 78% (Clausen et al., 1998; Glisson, 1996; Hurlburt et al., 2004). Little evidence, however, exists as to how children's mental health status affects safety and permanence over time.

The objectives of this study are to compare safety and permanence outcomes of children with mental health needs from those of children without mental health needs. First, previous studies comparing safety and permanence of children with and without

mental health needs are reviewed. After the data set is introduced, measures and analyses are described. Then, results are reported. Finally, study limitations and policy implications are addressed.

Literature review

Recurrent maltreatment for children with mental health needs

A recent study found that 8.9% of children who experienced substantiated or indicated child abuse and/or neglect had another substantiated or indicated report within a 6-month period (U.S. Department of Health and Human Services, Administration on Children, & Youth and Families, 2002). In general, research whose definitions of disabilities have included both physical and mental health problems have found that children with disabilities are at a higher risk of being abused and neglected than children without disabilities (Goldson, 2001; Kendall-Tackett, Lyon, Taliaferro, & Little, 2005; Patricia M. Sullivan & Knutson, 2000a; P. M. Sullivan & Knutson, 2000b; Vig & Kaminer, 2002). Children with mental health problems may be at particularly high risk because of difficulty interacting with caregivers. For instance, children with conduct disorders tended to contribute to family conflict and aggression (Braungartrieker, Rende, Plomin, Defries, & Fulker, 1995). This finding implies that outcomes need to be examined separately for children with mental health problems.

Only two studies to date have examined the effects of children's mental health needs on repetitive maltreatment (Fuller, 2005; Palusci, Smith, & Paneth, 2005). One study found that infants' mental health problems increased the risk of maltreatment reoccurrence (Palusci et al., 2005). The very small number of children with either mental

health problems or mental retardation, however, was very small (15). Thus, their inference is somewhat problematic. Another study did not find any association between the presence of a DSM diagnosis and recurrence in the first 60 days among 174 families with children returning home from their first stay in substitute care (Fuller, 2005). Although a few studies investigated maltreatment reoccurrence through multiple time intervals (DePanfilis & Zuravin, 1999a; Fuller, Wells, & Cotton, 2001), no previous study has examined the role of mental health needs in maltreatment recurrence across both short and long periods. Such a design is necessary to support policy decisions addressing children's long-term safety.

Permanence for children with mental health needs

Previous studies have found that the presence of mental health problems decreased the likelihood of reunification and adoption (Connell, Katz, Saunders, & Tebes, 2006; Landsverk, Davis, Ganger, Newton, & Johnson, 1996), increased placement disruption (Chamberlain et al., 2006; James, 2004a; James, Landsverk, & Slymen, 2004b), longer stays in foster care (Kupsinel & Dubsky, 1999), and increased placement changes (Newton et al., 2000). One study, however, did not find a significant association between mental health problems and longer stays in foster care (Benedict & White, 1991).

Studies employing the CBCL indicate that children's externalizing problems tend to undermine permanence more than internalizing problems do. The CBCL was used to measure mental health needs in four studies (James, 2004a; James et al., 2004b;

Landsverk et al., 1996; Newton et al., 2000). Children with either total behavior problem (James et al., 2004b; Newton et al., 2000; Taussig, Clyman, & Landsverk, 2001) or externalizing behaviors (James et al., 2004b; Newton et al., 2000; Taussig et al., 2001) were less likely to achieve permanence (e.g., experienced greater placement disruption, numbers of placement changes, and failure to reunify with their families). With regards to internalizing behaviors, however, only one out of the four studies found a significant association with permanence (Newton et al., 2000), while the other three did not find such significant relationship (James et al., 2004b; Newton et al., 2000; Taussig et al., 2001).

Lessons from prior studies

Overall, prior research indicates that the mental health of children in the child welfare system may affect safety and probably affects permanence. Some limitations of previous studies, however, merit additional investigation. First, the two studies on mental health and safety had conflicting results. Neither did a clear pattern emerge from the more substantial body of evidence concerning permanence. Different samples and varying follow-up intervals may account for inconsistent findings. Thus, it is necessary to conduct research that examines permanence over multiple periods of time within one population.

Finally, previous safety and permanence studies represented single communities or regions. Assessment at the national level is necessary because of geographic differences in child welfare management and the structure of other health and social services. Another reason comes from the multiple financial streams to child welfare

system. Besides federal funding, each state and local government may contribute to child welfare services. Medicaid is a major source of funding for health care services for children in the child welfare system. Difference in Medicaid policies could partly account for difference in child welfare practices. When assessing safety and permanency at the national level, we can also consider differences in each service area, here generally defined as the county. One way to address this difference is to conduct a hierarchical analysis.

Other factors affecting safety and permanence

Previous studies have found three types of factors to be related to the reoccurrence of maltreatment and permanence arrangements. First, relevant children's characteristics include age (Chamberlain et al., 2006; Connell et al., 2006; Coohy, 2006; DePanfilis & Zuravin, 2002; Fuller, 2005; Fuller et al., 2001; Lipien & Forthofer, 2004; Marshall & English, 1999; Massinga & Pecora, 2004), race (Brooks, Barth, Bussiere, & Patterson, 1999; Connell et al., 2006; Harris & Courtney, 2003; Lipien & Forthofer, 2004; Lu et al., 2004; Palusci et al., 2005; K. Wells & S. Guo, 1999), maltreatment type (Connell et al., 2006; Delfabbro, Barber, & Cooper, 2003; Fuller et al., 2001; Lipien & Forthofer, 2004; Marshall & English, 1999; K. Wells & S. Guo, 1999; K. Wells & S. Y. Guo, 1999), insurance coverage (Levy HB, Markovic J, Chaudhry U, Ahart S, & H, 1995), number of siblings (Chamberlain et al., 2006; DePanfilis & Zuravin, 1999a; Fuller, 2005; Wolock, Sherman, Feldman, & Metzger, 2001), and prior maltreatment history (Coohy, 2006; English, Marshall, Brummel, & Orme, 1999; Fuller et al., 2001; Hamilton & Browne, 1999; Marshall & English, 1999).

Second, caregiver characteristics affecting safety and permanence include unemployment status(Coohey, 2006; Levy HB et al., 1995), drug/substance abuse (English et al., 1999; Fuller et al., 2001; Hamilton & Browne, 1999; Maluccio & Ainsworth, 2003; Wolock et al., 2001), emotional disturbance (Palusci et al., 2005), domestic violence (English et al., 1999; Palusci et al., 2005), criminal behavior (Fuller & Wells, 2003), and mental illness (Christina, Layne, Debra Truett, & Jennifer, 2004; Fuller, 2005).

Finally, type of placement (English et al., 1999; Fuller, 2005), family financial stress (DePanfilis & Zuravin, 2002; Jones, 1998), single parenthood (Fuller & Wells, 2003; Fuller et al., 2001; Levy HB et al., 1995), and receipt of child welfare services have all been associated with safety and permanence (Taussig et al., 2001).

Hypotheses

Given the rising levels of emotional and financial stress for families with children suffering from mental health problems, these children have elevated risks of repeated maltreatment. Potential caregivers may be concerned about meeting these children's special needs. Caseworkers may also regard children's mental health problem reasons for being removed from home. Thus, children with mental health needs may be less likely to reach permanence than those without such needs. Formally, we hypothesized:

Hypotheses 1: Children with mental health needs are more likely to experience reoccurrence of maltreatment compared to those without mental health needs.

Hypotheses 2: Children with mental health needs are less likely to achieve permanence compared to those without mental health needs.

Methods

Data source

Data were drawn from the Child Protective Services (CPS) cohort of the National Survey of Child and Adolescent Well-Being (NSCAW) (n=5,501). NSCAW is the first national study of child welfare to collect data from children and families and to relate child and family well-being to family characteristics, experience with the child welfare system, community environment, and other factors (Dowd et al., 2004). The target population of the NSCAW CPS consists of all children in the U.S. who were subjects of child abuse or neglect investigations conducted by CPS agencies from October 1999 through December 2002 (Dowd et al., 2004). A two-stage stratified design was used to sample children in 92 primary sampling units in 48 states throughout the U.S. Interviews with children, their caregivers, and child welfare workers were conducted at 2-6 months (Wave 1), 12 months (Wave 2), 18 months (Wave 3), and 36 months (Wave 4) after the close of the investigation or assessment. Data from all study waves were used in the present analyses.

Analytic samples²

For each of the outcomes of interest, safety and permanence, data from a subsample of CPS children were analyzed as described below³. Weighting adjusted the estimates for the differential probabilities of inclusion in the sample: the probability of

² The sample size of safety analysis differs from that for permanence analysis due to different study purposes and different target population.

³ All frequencies and percentages reported in this section were not adjusted by weights for the purpose of describing the sample.

selecting the county of residence for the child and the probability of selecting the child given that the child's county of residence was sampled (Dowd et al., 2004).

Sample used in predicting safety

Children in this analytic sample were maltreatment victims substantiated at baseline and were no less than two-years old at baseline. The primary predictor variable, CBCL, was only available for children aged 2 or above (Achenbach & Edelbrock, 1991). The subsample size was 1,811.

Among these 1,811 children, 819 were boys (45.2%). The children ranged in age from 2 to 14: 537 were 2 to 5 years old (29.6%), 708 were 6 to 10 years old (39.1%), and the remaining were 11 to 14 years old (31.3%). Nearly 30 percent of children were non-Hispanic black (n=527), 44 percent were non-Hispanic white (n=799) and the remainder were Hispanic children and children with other races (n=485).

Sample used in predicting permanence

Permanence outcomes were analyzed for children from the CPS sample who were living in foster care and were at least 2 years old at baseline. The subsample size was 390.

Forty-seven percent of the permanence sample was male. The children ranged from 2 to 14 years old: 101 were 2 to 5 years old (25.9%), 172 were 6 to 10 years old (44.1%), and the remaining were 11 to 14 years old (30.0%). The sample was 36.2% non-Hispanic black (n=141), 42.6% non-Hispanic white (n=166), and 21.3% of other race/ethnicity (n=83).

Mental health needs as independent variables

Caregiver responses to the CBCL concerning children's behaviors were used to assess the children's mental health needs. Achenbach and Edelbrock (1991) designed two versions of the CBCL questionnaire, one for children aged 2 to 3 and the other for children aged 4 to 18. The total problem score reflects the overall level of problem behaviors present. In addition, the CBCL identifies two broad-band syndromes, designated as internalizing problems (e.g., withdrawal, somatic complaints, anxiety/depression, and sleep problems) and externalizing problems (e.g., aggressive and destructive behavior). Child mental health needs at baseline were measured by three scores: total CBCL score, externalizing pattern behavior, and internalizing pattern behavior. As specified by Achenbach and Edelbrock (1991), children in both age groups classified as having clinical problem behaviors were scored above 63 on a 1-100 scale for total problem, externalizing, and internalizing behaviors.

Measures of child safety as dependent variables

Child safety was measured in two ways: short term and long term. To maintain consistency with "Child Welfare Outcomes: Annual Report" (U.S. Department of Health and Human Services et al., 2002), short term safety was defined as the absence of a maltreatment report in the first 6 months (183 days) from the initial investigation date. Long term safety was defined as the absence of a maltreatment report from the last investigation date through the end of Wave 4 (maximum duration 1,860 days).

Measures of permanence as dependent variables

Permanence was measured in three ways. First, children with eventual permanence were defined as all those who were living in foster care at baseline but achieved reunification, adoption, or legal guardianship by the end of Wave 4. Second, because reunification with parents is the most common outcome for children living in foster care, a return home by Wave 4 was defined as reunification. Both permanence and the separate measure of reunification were measured both as dichotomous variables indicating whether or not the outcome occurred in a specified time frame (1=permanence, 0=failure to achieve permanence) and, alternatively, as the number of days in foster care. The third measure of permanence was the total number of placements the child experienced between Wave 1 and Wave 4.

Other variables

Covariates in this study included child demographic characteristics (age, gender, and race/ethnicity), placements at baseline, maltreatment types, family risk level, insurance types, receipt of child welfare services, and family yearly income (Table 2.1).

Analyses

Univariate and bivariate analyses were used to describe and compare subgroups (e.g., children with a new maltreatment report *vs.* children without new reports, children who achieved permanence *vs.* children who did not achieve permanence). Chi-square tests were used to determine whether children's characteristics differed significantly between groups. Multiple imputation (MI) was used to impute missing independent

variable values. Finally, proportional hazard models and generalized linear models (GLM) with Poisson distributions were used to test the study hypotheses. Proportional hazard modeling estimated the effects of children's mental health needs on safety and permanence. Our proportional hazard models assume a multiplicative relationship between the underlying hazard function of the covariates and a log-linear relationship between the independent variables and the underlying hazard function (Cox & Oakes, 1984). Because of the multilevel structure of data, cluster option was used in models to specify that the observations were independent across child welfare agencies. All analyses except MI were performed using Stata 9.2. IVEware package running in SAS 9.1 was used to conduct MI.

Table 2.1: Variables and their categories

Variables	Definition
<i>Mental health needs at baseline</i>	
Total behavior problem	CBCL total standard score ≥ 64 ; reported by caregiver
Externalizing behavior	CBCL externalizing standard score ≥ 64 ; reported by caregiver
Internalizing behavior	CBCL internalizing standard score ≥ 64 ; reported by caregiver
<i>Safety</i>	
Short term safety	Absence of a new maltreatment report in first 6 months after child welfare caseworkers began their maltreatment investigation
Long term safety	Absence of a new maltreatment report by Wave 4 after child welfare caseworkers began their maltreatment investigation
<i>Permanence</i>	
Eventual permanence	Achieved reunification, adoption, and legal guardianship by Wave 4
Reunification	Reunified with family by Wave 4
Instability	Number of out-of-home placements by Wave 4
<i>Other variables (collected at baseline)</i>	
Age group	2-5 yrs, 6-10 yrs, and ≥ 11 yrs
Gender	Boy and girl
Race/ethnicity	non-Hispanic black, non-Hispanic white, Hispanic, and other races
Maltreatment type	Physical maltreatment, sexual maltreatment, neglect, and other types of maltreatment
Insurance status	Medicaid, private insurance, and others (e.g., self-pay and other insurance)
Placement settings	In-home setting, foster care, kinship care, group home/residential program, and others
Receipt of services [*]	Receiving child welfare services at baseline
Risk level [§]	Low, medium, and high
Annual family income	0-9,999, 10,000-19,999, 20,000-29,999, 30,000-39,999, and $\geq 40,000$ (unit: US dollar)
Large family	Family with 2 or more children
Chronic disease	Chronic disease status reported by caregiver

^{*} After child welfare finished maltreatment investigation, some children were not received child welfare services.

[§] It is a percentile scale of cumulative risks, which are examined by caseworker in Risk Assessment section of NSCAW. These risks include child poor ability to self-protect, child special needs, caregiver's substance abuse, caregiver's mental health problems, caregiver's recent law involvement, caregiver's history of abuse of neglect, parenting, high stress on family, low social support, reasonable level of cooperation between caseworker and caregiver, and etc.

Modeling of safety outcomes

Proportional hazard modeling was used to estimate the effects of children's mental health needs on the number of days to reoccurrence of a maltreatment report. The outcome in each hazard model was coded as 1 in cases that experienced a new maltreatment report in the specified time period, or coded as 0 in cases with no occurrence of a new maltreatment report.

Modeling of permanence outcomes

Proportional hazard modeling was also used to estimate the effects of mental health needs on likelihood of eventual permanence and reunification. GLM with poisson regression is usually used to model the number of counts (occurrences) of an event. Here it was conducted to test the hypothesis that mental health needs would predict more out-of-home placements.

Results⁴

Safety

Prevalence of mental health needs and reoccurrence of maltreatment

The prevalence of total behavior problems within the safety sample was 31.6%; that of externalizing pattern behaviors was 29.4%; and that of internalizing pattern behaviors was 20.3% (Table 2.2).

In the first 6 months after the child welfare agencies began their investigations (183 days), only 4% of children had a new report. The length of time from the investigation date to the date of the subsequent report ranged from 0 to 181 days (mean=77.4, SD= 8.4).

From the date the investigation was conducted to the end of Wave 4, over one quarter of children (27.6%) had at least one new maltreatment report. The length of time from the investigation date to the date of the subsequent report ranged from 0 to 1,268 days, with an average of 533 days (SD= 31.8). For those without any maltreatment report, the period of observation ranged from 1,172 to 1,860 days. This discrepancy can be explained by the initial maltreatment investigation beginning at a different time, as well as a difference in the timing of the Wave 4 interview.

Bivariate safety analyses

Table 2.2 compares the demographic, socioeconomic, and child welfare service characteristics between children with a new maltreatment report and children without new reports, for both short-term and long-term outcomes. Chi-square tests indicated that

⁴ Percentages, means, deviations, coefficients, and risk ratios shown in “Results” section are all weighted unless with special explanation.

differences did exist in the total behavior problem and externalizing behavior scales, family risk level, annual family income, childhood chronic disease, and annual family income. The externalizing behavior status of re-abused children significantly differed from that of children without such experience, both in the short run ($\chi^2=9.97$, $p=0.002$) and in the long run ($\chi^2=5.49$, $p=0.022$). For children who had externalizing behaviors in a clinical range (>63), the likelihood of a new maltreatment report in the first 6 months was nearly 3 times that of children who did not have externalizing behavior (7.2% vs. 2.6%). By the end of Wave 4, the proportions had risen to 30.1% and 22.1%, respectively. In the short-term, children with total behavior problems at baseline was also nearly 2.7 times more likely to have a new report than children who did not have total behavior problems (7.0% vs. 2.6%; $\chi^2=6.46$, $p=0.013$). The proportion of internalizing pattern behaviors, however, was similar between groups ($p>0.05$).

Table 2.2: Characteristics of children with substantiated report at baseline

			Presence of a new maltreatment report in first six months		Presence of a new maltreatment report through Wave 4	
	Unweighted Total (n)	Weighted %	Unweighted Yes (n)	Weighted %	Unweighted Yes (n)	Weighted %
	1811	100	80	4.0	451	27.6
Total behavior problem at baseline						
No	1159	68.4	40	2.6	252	22.1
Yes	652	31.6	40	7.0	199	30.1
			$\chi^2=6.46, p=0.013$		$\chi^2=1.92, p=0.171$	
Externalizing behavior at baseline						
No	1211	70.6	42	2.6	266	21.2
Yes	585	29.4	37	7.2	182	33.1
			$\chi^2=9.97, p=0.002$		$\chi^2=5.49, p=0.022$	
Internalizing behavior at baseline						
No	1335	79.7	51	3.3	312	24.5
Yes	461	20.3	28	6.4	136	25.3
			$\chi^2=2.10, p=0.152$		$\chi^2=0.02, p=0.878$	
Age group						
2-5 yrs	537	27.7	32	6.0	140	30.9
6-10 yrs	708	47.5	29	2.3	173	20.2
>=11 yrs	566	24.8	19	4.6	138	25.3
			$\chi^2=2.14, p=0.132$		$\chi^2=2.87, p=0.071$	
Gender						
Girl	992	54.9	39	3.2	239	25
Boy	819	45.1	41	4.9	212	24.2
			$\chi^2=0.9762, p=0.327$		$\chi^2=0.03, p=0.872$	
Race						
Non-Hispanic Black Non-Hispanic	527	23.6	19	3.7	114	16.8
White	799	51.2	41	5.2	214	29.0
Hispanic	346	19.8	15	1.9	88	25.0
Others	139	5.4	5	1.8	35	20.4
			$\chi^2=2.42, p=0.085$		$\chi^2=1.45, p=0.236$	
Maltreatment type						
Physical maltreatment	351	24.1	17	4.3	77	13.6
Sexual maltreatment	299	11.8	12	5.3	71	37.5
Neglect	657	38.7	32	4.6	187	26.9
Others	309	25.5	15	3.5	82	28.2
			$\chi^2=0.12, p=0.911$		$\chi^2=2.71, p=0.056$	

Table 2.2: Characteristics of children with substantiated report at baseline (cont'd)

	Unweighted Total (n)	Weighted %	Presence of a new maltreatment report in first six months		Presence of a new maltreatment report through Wave 4	
			Unweighted Yes (n)	Weighted %	Unweighted Yes (n)	Weighted %
Insurance type						
Medicaid	1279	64.5	57	4.6	333	27.7
Private	324	24.8	17	3.8	66	15.8
Others	208	10.7	6	1.1	52	26.3
			x ² =1.15, p=0.300		x ² =2.58, p=0.084	
Placement setting at baseline						
In-home setting	1229	67.9	55	3.8	314	25.4
Foster care	262	8.1	12	6.5	61	23.8
Kinship care	238	13.1	9	3	56	21.4
Group home	52	7.5	2	3	11	21.8
Others	30	1.0	2	5.9	9	17.4
			x ² =0.67, p=0.583		x ² =0.424, p=0.718	
Services received						
No	281	48.4	14	3.6	60	21.4
Yes	1530	51.6	66	4.3	391	27.9
			x ² =0.12, p=0.733		x ² =1.24, p=0.270	
Risk level						
Low	348	28.0	10	2.0	47	14.4
Medium	587	40.3	29	5.1	150	26.5
High	698	31.7	37	5.2	222	32.9
			x ² =1.40, p=0.250		x ² =5.23, p=0.010	
Annual family income (unit: \$)						
0-9,999	325	21.2	21	4.6	99	26.9
10,000-19,999	462	31.2	20	4.7	131	32.2
20,000-29,999	292	15.9	15	4.6	72	26.3
30,000-39,999	193	11.0	5	2.1	45	17.4
>=40,000	351	20.7	12	3.1	63	15.1
			x ² =0.41, p=0.776		x ² =2.84, p=0.038	
>=2 children						
No	487	25.6	23	4.2	114	23.9
Yes	1324	74.4	57	3.9	337	24.9
			x ² =0.06, p=0.811		x ² =0.06, p=0.806	
Chronic disease						
No	1288	73.6	53	3.3	305	21.7
Yes	504	26.4	26	5.9	142	32.6
			x ² =1.71, p=0.195		x ² =6.74, p=0.011	

Predicting short term safety

Three proportional hazard models were used to evaluate the effects of mental health needs on safety in the first 6 months after an investigation. Model 1 included total behavior problems as the independent variable; Model 2 examined externalizing behaviors; and Model 3 identified associations between internalizing behaviors and reabuse (Table 2.3). Several factors were significantly related to the reoccurrence of maltreatment. First, the externalizing score was an important predictor of maltreatment repetition. The maltreatment recurrence risk among children with externalizing behaviors at baseline was 92% higher than that of others ($p < 0.05$). Second, older children had less likelihood of re-abuse than younger ones in the first 6 months after investigations. For example, the risk of being re-maltreated among children aged from 6-10 years old was 72% ($p < 0.01$) lower than those 2-5 years old (Table 2.3, Model 1). Third, children in foster care were more likely to have a new maltreatment report than those living in an in-home setting (Hazard Ratio (HR)=3.39, $p < 0.05$; Table 2.3, Model 2). Finally, children with insurance status other than Medicaid (e.g., self-pay) had a lower probability of incurring a new maltreatment report (HR=0.15, $p < 0.05$; Table 2.3, Model 1).

Predicting long term safety

The same three indicators of mental health needs were then examined for their associations with reabuse in the long term, again with proportional hazard models. The total behavior problem score was used as an independent variable in Model 4, externalizing behaviors in Model 5, and internalizing behaviors in Model 6 (Table 2.3). Both total behavior problems and externalizing behavior problems were significantly

related to the recurrence of maltreatment. Children with total behavior problems were 43% more likely to experience re-abuse than children with a normal or borderline total CBCL score ($p<0.001$). The risk of being abused once again was 64% higher for children with clinical externalizing behavior scores ($p<0.001$). However, children with internalizing behaviors did not show a higher risk of maltreatment recurrence than those without internalizing behavior ($p>0.05$).

There were also some significant predictors among the controls. Children whose maltreatment type at baseline was neglect were 1.81 times more likely to have a new maltreatment report than children whose maltreatment type at baseline was physical maltreatment ($p<0.05$) (Table 2.3, Model 4). Sexual abuse was also associated with a greater risk of reabuse ($p<0.05$). Children staying in group homes at baseline had an 86% lower risk of reabuse than children at home ($p<0.001$) (Table 2.3, Model 4). Children with an insurance status other than Medicaid (e.g., self-pay) had a lower likelihood of incurring a new maltreatment report by Wave 4 ($HR=0.56$, $p<0.05$; Table 2.3, Model 4). Finally, children with high risk levels had a 77% higher chance of incurring a new maltreatment report than children with low risk levels ($HR=1.77$, $p<0.05$; Table 2.3, Model 6).

Table 2.3: Proportional hazard model on evaluating the hazard ratio of the re-abuse occurrence in short term and in long term

	Short term (presence of a new report in the first 6 months after initial child welfare investigation)			Long term (presence of a new report by Wave 4 after initial child welfare investigation)		
	Model 1 Hazard ratio	Model 2 Hazard ratio	Model 3 Hazard ratio	Model 4 Hazard ratio	Model 5 Hazard ratio	Model 6 Hazard ratio
Total behavior problem at baseline						
No (reference)	-	-	-	-	-	-
Yes	2.06	-	-	1.43*	-	-
Externalizing behavior at baseline						
No (reference)	-	-	-	-	-	-
Yes	-	1.92*	-	-	1.64*	-
Internalizing behavior at baseline						
No (reference)	-	-	-	-	-	-
Yes	-	-	1.3	-	-	1.01
Age group						
2-5 yrs (reference)	-	-	-	-	-	-
6-10 yrs	0.28***	0.29***	0.30***	0.89	0.89	0.94
>11 yrs	0.53	0.52	0.58	1.25	1.17	1.31
Gender						
Girl (reference)	-	-	-	-	-	-
Boy	0.99	1.05	1.01	0.97	0.97	1
Race						
Non-Hispanic Black (reference)	-	-	-	-	-	-
Non-Hispanic White	1.19	1.1	1.11	1.15	1.12	1.16
Hispanic	0.55	0.48	0.47	1.58	1.56	1.6
Others	0.63	0.7	0.6	1.29	1.33	1.2
Maltreatment type						
physical maltreatment (reference)	-	-	-	-	-	-
sexual maltreatment	1.94	2.12	2.14	1.82*	1.76	1.90*
Neglect	1.35	1.31	1.25	1.81*	1.84*	1.77*
Others	1.41	1.41	1.39	2.00*	2.04*	2.00*
Insurance type						
Medicaid (reference)	-	-	-	-	-	-
Private	1.56	1.69	1.67	0.66	0.69	0.69
Others	0.15*	0.16*	0.16*	0.56*	0.56	0.57*

p<0.05; ** *p*<0.01; *** *p*<0.001

Table 2.3 Proportional hazard model on evaluating the hazard ratio of the re-abuse occurrence in short term and in long term (cont'd)

	Short term (presence of a new report in the first 6 months after initial child welfare investigation)			Long term (presence of a new report by Wave 4 after initial child welfare investigation)		
	Model 1 Hazard ratio	Model 2 Hazard ratio	Model 3 Hazard ratio	Model 4 Hazard ratio	Model 5 Hazard ratio	Model 6 Hazard ratio
Placement setting at baseline						
In-home setting (reference)	-	-	-	-	-	-
Foster care	2.82	3.39*	3.17*	0.82	0.83	0.85
Kinship care	1.02	1.08	1.02	0.65	0.66	0.68
Group home	0.84	0.86	0.83	0.14**	0.14**	0.16**
Others	2.1	2.05	1.86	0.81	0.76	0.77
Services received						
No (reference)	-	-	-	-	-	-
Yes	0.79	0.8	0.82	0.68	0.67	0.7
Risk level						
Low (reference)	-	-	-	-	-	-
Medium	2.48	2.49	2.77	1.29	1.29	1.39
High	3.29	3.26	3.75	1.63	1.61	1.77*
Annual family income (\$)						
0-9,999 (reference)	-	-	-	-	-	-
10,000-19,999	1.3	1.21	1.17	1.22	1.26	1.16
20,000-29,999	1.47	1.42	1.26	1.2	1.18	1.12
30,000-39,999	0.44	0.43	0.46	0.98	1.01	0.95
>=40,000	0.63	0.55	0.54	0.75	0.75	0.69
>=2 children in household						
No (reference)	-	-	-	-	-	-
Yes	0.58	0.62	0.57	1.12	1.09	1.09
Chronic disease						
No (reference)	-	-	-	-	-	-
Yes	0.74	0.69	0.67	0.85	0.85	0.78

p<0.05; ** *p*<0.01; *** *p*<0.001

Permanence

Prevalence of mental health needs and prevalence of permanence outcomes

The prevalence of total behavior problems and externalizing behaviors among children in foster care at baseline were 54.1% and 44.4%, respectively, while the prevalence of internalizing pattern behaviors was only 34.1%. Overall, the length of time in foster care for the permanence sample ranged from 15 days to 1,216 days (mean=787.1, SD= 33.8). At the end of Wave 4, 45.7% of children had achieved either reunification, adoption, or legal guardianship. The average length of time to eventual permanence among those children was 558.7 days (SD=39.6). In addition, nearly a quarter of children returned to their homes by Wave 4 (24.0%). The average length of time to achieve reunification among these children was 415.6 days (SD=44.1). Finally, the average number of placements was 5.0, with the range from 1 to 12 (SD=0.2).

Bivariate analysis

Table 2.4 compares the demographic, socioeconomic, and child welfare service characteristics at baseline between children who did and did not achieve permanence by Wave 4. Bivariate analysis revealed no statistically significant differences between the two groups in total behavior problems, externalizing behaviors, internalizing behaviors, gender, maltreatment type, annual family income, family size, or chronic disease status. There were, however, differences in age, insurance type, the receipt of child welfare services, and risk levels between groups with different permanence outcomes ($p < 0.05$).

Table 2.4: Characteristics of children living in foster care at baseline

	Total		Achieve eventual permanence [§]		Return home [*]	
	Unweighted Total (n)	Weighted %	Unweighted Yes (n)	Weighted %	Unweighted Yes (n)	Weighted %
Total behavior problem at baseline at baseline (n=390)	390	100%	172	45.7	92	24.0
No	216	45.9	92	44.1	51	27.9
Yes	174	54.1	67	47.2	30	20.7
			$\chi^2 = 0.12, p=0.733$		$\chi^2 = 0.87, p=0.353$	
Externalizing behavior at baseline (n=385)						
No	228	55.6	91	39.8	48	22.8
Yes	157	44.4	67	53.7	33	25.5
			$\chi^2 = 2.04, p=0.157$		$\chi^2 = 0.11, p=0.743$	
Internalizing behavior at baseline (n=385)						
No	268	65.9	113	43.5	62	27.0
Yes	117	34.1	45	50.4	19	19.0
			$\chi^2 = 0.38, p=0.541$		$\chi^2 = 0.90, p=0.345$	
Age group (n=390)						
2-5 yrs	101	23.4	52	64.8	20	19.1
6-10 yrs	172	49.1	73	48.3	40	29.3
>=11 yrs	117	27.6	34	28.3	21	18.4
			$\chi^2 = 4.19, p=0.018$		$\chi^2 = 1.05, p=0.350$	
Gender (n=390)						
Girl	208	47.5	85	55.5	39	24.9
Boy	182	52.5	74	37.3	42	23.3
			$\chi^2 = 2.96, p=0.089$		$\chi^2 = 0.04, p=0.843$	

[§]Fifty-nine children' eventual permanence outcomes at Wave 4 cannot be identified.

^{*}Forty-six children' placements at Wave 4 cannot be identified.

Table 2.4: Characteristics of children living in foster care at baseline (cont'd)

	Total		Achieve eventual permanence [§]		Return home [*]	
	Unweighted Total (n)	Weighted %	Unweighted Yes (n)	Weighted %	Unweighted Yes (n)	Weighted %
Race (n=390)						
Non-Hispanic Black	141	36.9	58	35.8	30	23.7
Non-Hispanic White	166	40.4	69	56.6	32	30.2
Hispanic	53	15.7	20	25.1	14	10.0
Others	30	7.0	12	58.8	5	21.7
			$\chi^2 = 2.27, p=0.082$		$\chi^2 = 1.33, p=0.267$	
Maltreatment type (n=365)						
physical maltreatment	64	23.2	28	51.9	18	35.1
sexual maltreatment	62	9.9	27	61.3	11	23.3
Neglect	160	47.9	72	43.5	38	20.7
Others	74	19.0	25	56.5	10	31.3
			$\chi^2 = 0.62, p=0.562$		$\chi^2 = 0.71, p=0.518$	
Insurance type (n=390)						
Medicaid	374	96.6	154	46.1	78	24.4
Private	6	1.9	1	3.6	1	3.1
Others	10	1.6	4	69.6	2	21.1
			$\chi^2 = 4.04, p=0.024$		$\chi^2 = 1.50, p=0.226$	
Services received (n=390)						
No	31	38.7	13	30.6	7	13.5
Yes	359	61.3	146	53.9	74	30.7
			$\chi^2 = 4.96, p=0.029$		$\chi^2 = 3.61, p=0.061$	

[§]Fifty-nine children' eventual permanence outcomes at Wave 4 cannot be identified.

^{*}Forty-six children' placements at Wave 4 cannot be identified.

Table 2.4: Characteristics of children living in foster care at baseline (cont'd)

	Total		Achieve eventual permanence [§]		Return home [*]	
	Unweighted Total (n)	Weighted %	Unweighted Yes (n)	Weighted %	Unweighted Yes (n)	Weighted %
Risk level (n=362)						
Low	38	15.9	15	29.3	5	3.2
Medium	73	22.6	36	41.8	20	28.1
High	251	61.5	102	56.5	52	31.7
			$\chi^2 = 1.70, p=0.186$		$\chi^2 = 4.32, p=0.011$	
Annual family income (n=338)						
0-9,999	8	4.7	5	84.3	3	59.5
10,000-19,999	41	9.6	17	59.5	8	24.3
20,000-29,999	55	14.3	23	31.1	12	16.4
30,000-39,999	72	26.1	27	44.2	11	19.6
>=40,000	162	45.3	66	46.7	33	24.8
			$\chi^2 = 0.93, p=0.427$		$\chi^2 = 0.50, p=0.670$	
>=2 children in household (n=390)						
No	76	17.8	25	32.6	13	21.5
Yes	314	82.2	134	48.6	68	24.5
			$\chi^2 = 1.71, p=0.194$		$\chi^2 = 0.09, p=0.762$	
chronic disease (n=380)						
No	299	84.2	120	45.6	67	26.5
Yes	81	15.8	35	46.8	11	12.3
			$\chi^2 = 0.01, p=0.914$		$\chi^2 = 2.64, p=0.108$	

[§]Fifty-nine children' eventual permanence outcomes at Wave 4 cannot be identified.

^{*}Forty-six children' placements at Wave 4 cannot be identified.

Predicting eventual permanence

Three proportional hazard models were used to evaluate the effects of mental health needs on permanence outcomes. In Model 1, the independent variable was the presence of total behavior problems, in Model 2 the independent variable was externalizing behaviors, and in Model 3 the independent variable was internalizing behaviors (Table 2.5). Proportional hazard models revealed that none of these mental health measures was a significant predictor of permanence among children living in foster care at baseline ($p > 0.05$).

A number of controls were significantly related to permanence outcomes: age, race, the receipt of child welfare services, and health insurance status. Children 11 years old or above were less likely to achieve permanence, compared with those between 2 and 5 years old (HR = 0.48, $p < 0.001$) (Table 2.5, Model 3). Hispanic children were also less likely to achieve permanence than were non-Hispanic black children (HR = 0.27, $p < 0.05$) (Table 5, Model 2). Children receiving child welfare services were more likely to achieve permanence than were children without such assistance (HR = 2.86, $p < 0.01$) (Table 2.5, Model 1). Finally, children with other insurance statuses (e.g., self-pay) were more likely to achieve permanence than were children with Medicaid (HR = 2.24, $p < 0.01$) (Table 2.5, Model 1).

Predicting reunification

Three proportional hazard models were used to test the effects of mental health needs on reunification. The presence of total behavior problems was used as an independent variable in Model 4, externalizing pattern behaviors in Model 5, and

internalizing pattern behaviors in Model 6 (Table 2.5). Neither total behavior problems nor externalizing problems was a significant predictor of reunification ($p>0.05$). The likelihood of reunification for children with clinical internalizing problem scores was 45% lower than that of those with normal internalizing problem scores ($HR=0.45$, $p<0.01$) (Table 2.5). In addition to mental health status, chronic disease status in all three models was significantly related to reunification. Children with chronic diseases had lower likelihood of reunification than did other children ($HR=0.26$, $p<0.01$) (Table 2.5, Model 4).

Predicting the number of placements

Three GLM models with Poisson distributions were used to test the effects of mental health needs on the number of placements. The presence of total behavior problems was the independent variable in Model 1, clinical externalizing problem score in Model 2, and clinical internalizing problem score in Model 3, respectively (Table 2.6). Model 1 showed that having clinical total behavior problems increased the expected number of placements by 6% (Incidence rate ratio (IRR)=1.06, $p<0.001$). Externalizing pattern behaviors and internalizing pattern behaviors were also significant predictors of numbers of placement ($p<0.05$). Children aged 11 years or above had 19% more placements than children between 2 and 5 in Model 3 (IRR=1.19, $p<0.05$). Finally, being a boy increased the expected number of placements by 6% (IRR=1.06, $p<0.05$) (Table 2.6, Model 1).

Table 2.5. Proportional hazard model of predicting the effects of children and their families' characteristics on permanence outcomes by Wave 4

	Eventual permanence			Reunification		
	Model 1 Hazard ratio	Model 2 Hazard ratio	Model 3 Hazard ratio	Model 4 Hazard ratio	Model 5 Hazard ratio	Model 6 Hazard ratio
Total behavior problem at baseline						
No (reference)	-	-	-	-	-	-
Yes	0.72	-	-	0.57	-	-
Externalizing behavior at baseline						
No (reference)	-	-	-	-	-	-
Yes	-	1.07	-	-	0.95	-
Internalizing behavior at baseline						
No (reference)	-	-	-	-	-	-
Yes	-	-	0.59	-	-	0.45**
Age group						
2-5 yrs (reference)	-	-	-	-	-	-
6-10 yrs	1.08	1.05	1.03	1.65	1.56	1.59
>11 yrs	0.55	0.52	0.48*	0.95	0.83	0.73
Gender						
Girl (reference)	-	-	-	-	-	-
Boy	0.84	0.79	0.9	1.33	1.24	1.52
Race						
Non-Hispanic Black (reference)	-	-	-	-	-	-
Non-Hispanic White	0.53	0.57	0.52	0.58	0.65	0.61
Hispanic	0.29	0.27*	0.3	0.37	0.33	0.42
Others	0.53	0.54	0.46	2.61	2.61	2.29
Chronic disease						
No (reference)	-	-	-	-	-	-
Yes	0.48	0.5	0.5	0.26**	0.26**	0.27***

p<0.05; ** *p*<0.01; *** *p*<0.001

Table 2.5: Proportional hazard model of predicting the effects of children and their families' characteristics on permanence outcomes by Wave 4 (cont'd)

	Eventual permanence			Reunification		
	Model 1 Hazard ratio	Model 2 Hazard ratio	Model 3 Hazard ratio	Model 4 Hazard ratio	Model 5 Hazard ratio	Model 6 Hazard ratio
Maltreatment type						
physical maltreatment (reference)	-	-	-	-	-	-
sexual maltreatment	1.77	1.67	1.69	1.09	0.93	1.03
Neglect	0.81	0.86	0.68	0.67	0.71	0.53
Others	1.11	1.04	1.01	0.73	0.67	0.67
Insurance type						
Medicaid (reference)	-	-	-	-	-	-
Private	0.15	0.16	0.12	0.46	0.75	0.3
Others	2.24*	2.51*	1.79	0.3	0.37	0.28
Services received						
No (reference)	-	-	-	-	-	-
Yes	2.86**	3.18**	2.52*	2.48	3.08	2.08
Risk level						
Low (reference)	-	-	-	-	-	-
Medium	1.82	1.74	1.91	7.05	8.55	7.41
High	1.54	1.41	1.69	4.97	5.48	5.75
>=2 children in household						
No (reference)	-	-	-	-	-	-
Yes	1.53	1.47	1.55	1.21	1.22	1.22
Annual family income (\$)						
0-9,999 (reference)	-	-	-	-	-	-
10,000-19,999	4.7	4.28	4.12	6.37	5.3	4.79
20,000-29,999	1.9	1.82	1.7	2.18	1.89	1.67
30,000-39,999	2.16	2	2.05	2.95	2.58	2.44
>=40,000	2.9	2.85	2.39	3.79	3.85	2.59

p<0.05; ** *p*<0.01; *** *p*<0.001

Table 2.6: Generalized Linear Model with Poisson regression predicting the effect of mental health needs on the number of placements by Wave 4

	Model 1 Incidence rate ratio	Model 2 Incidence rate ratio	Model 3 Incidence rate ratio
Total behavior problem at baseline			
No (reference)	-	-	-
Yes	1.06***	-	-
Externalizing behavior at baseline			
No (reference)	-	-	-
Yes	-	1.09***	-
Internalizing behavior at baseline			
No (reference)	-	-	-
Yes	-	-	1.09*
Age group			
2-5 yrs (reference)	-	-	-
6-10 yrs	1.05	1.06	1.06
>11 yrs	1.17	1.16	1.19*
Gender			
Girl (reference)	-	-	-
Boy	1.06*	1.05	1.05
Race			
Non-Hispanic Black (reference)	-	-	-
Non-Hispanic White	1.01	1.01	1.00
Hispanic	0.89	0.88	0.88
Others	0.96	0.98	0.98
Maltreatment type			
physical maltreatment (reference)	-	-	-
sexual maltreatment	1.02	1.03	1.03
Neglect	1.04	1.04	1.05
Others	1.02	1.03	1.02
Insurance type			
Medicaid (reference)	-	-	-
Private	1.04	1.03	1.01
Others	1.02	1.02	1.01
Services received			
No (reference)	-	-	-
Yes	0.94	0.93	0.93
Risk level			
Low (reference)	-	-	-
Medium	0.97	0.97	0.99
High	0.98	0.98	1.00

Table 2.6: Generalized Linear Model with Poisson regression predicting the effect of mental health needs on the number of placements by Wave 4 (cont'd)

	Model 1 Incidence rate ratio	Model 2 Incidence rate ratio	Model 3 Incidence rate ratio
>=2 children in household			
No (reference)	-	-	-
Yes	1.08	1.09	1.08
Annual family income (\$)			
0-9,999 (reference)	-	-	-
10,000-19,999	1.08	1.04	1.05
20,000-29,999	0.98	0.96	0.95
30,000-39,999	1.05	1.01	1.02
>=40,000	1.08	1.04	1.06
Chronic disease			
No (reference)	-	-	-
Yes	1.02	1.03	1.03

Discussion

This study evaluated the safety and permanence outcomes among children with mental health needs in the child welfare system and tests whether children with and without mental health needs differed in safety and permanence. We hypothesized that in comparison to those without such needs, children with mental health needs were at a higher risk of experiencing re-maltreatment and failing to achieving permanence (e.g., achieving reunification, adoption, legal guardianship, and having fewer out-of-home placements).

Our results support both hypotheses. Externalizing pattern behaviors predicted the reoccurrence of maltreatment not only for the first 6 months but also for a period of up to 5 years following the initial investigation. Moreover, total behavior problems reduced the likelihood of long-term safety, whereas internalizing pattern behaviors were significantly and positively related to failing to achieve reunification. More placements were significantly associated with total behavior problems, externalizing problems, and internalizing problems. In summary, our study finds that having mental health needs increased the risk of having a new maltreatment report and decreased the likelihood of reaching permanence.

In spite of the high prevalence of mental health problems among children in child welfare, there has been relatively sparse empirical evidence about whether or how these children's service experiences and outcomes differed from those of other children. Our study is the first one to show the relationship between initial mental health status and subsequent safety and permanence in a national sample. Also, our study is the first one to investigate the unique role of child mental health status in predicting the reoccurrence of

childhood maltreatment in both the short and long terms. Furthermore, we have extended previous studies by testing the separate effects of externalizing behaviors and internalizing behaviors on safety and permanence. Our contribution also improves upon prior studies in terms of more appropriate methods (Kupsinel & Dubsky, 1999; Newton et al., 2000). Instead of linear regression models, generalized linear models with Poisson regression was used to test the hypothesis that children with mental health needs would experience more out-of-home placements. Generalized linear models are preferable to linear regression because count variables are skewed, bounded at zero, and heteroskedastic (McCullagh & Nelder, 1983).

Mental health needs and safety

Among children in the child welfare system, those with mental health needs are more likely to experience maltreatment than others. Children with mental health problems may have difficulties in attaching to or interacting with caregivers (Fonagy, 2000; Vanijzendoorn, Goldberg, Kroonenberg, & Frenkel, 1992). These difficulties may lead to stress between the children and their caregivers that in turn increases risk of additional neglect or abuse. For instance, compared to caregivers with normally developing children, caregivers of children with externalizing problems reported higher child-related stress and less positive feelings about parenting (Anastopoulos, Guevremont, Shelton, & Dupaul, 1992; Donenberg & Baker, 1993). Families who have children with mental health problems also face an increased financial burden for health care (e.g., increased physician visits) and for special assistance that may strain family resources. Such family stress raises the risk of child maltreatment (DePanfilis & Zuravin,

1999b, 2002; Elmer, 1979; Gershenson, 1977; Lyons, Henly, & Schuerman, 2005; Salzinger et al., 2002; Sprang, Clark, & Bass, 2005; Wind & Silvern, 1994).

Mental health needs and permanence

Among those living in foster care, children with mental health problems face difficulties in achieving permanence (e.g., through reunification with birth parents, guardian with relatives, and adoption) and maintaining a permanent arrangement (i.e., placement stability).

Caregiver candidates may be reluctant to take these children given the uncertainty over the level of care required. In a telephone survey of 916 people from a nationally representative sample, most people agreed that the relationship between adopted children with severe behavioral problems and their adoptive parents would eventually be disrupted (Hollingsworth, 2003). In addition, children with severe psychological conditions are usually regarded as having special needs. This may give potential adoptive parents pause.

From a caseworker's perspective, severe mental health problems may be considered a negative outcome for the family. This is probably one of the main reasons for child removal from families (Thieman & Dail, 1997). Caseworkers may also either delay or recommend against reunification because of concerns about family capability to meet a child's needs. These arguments suggest that mental health problems may play an important role in permanence (Landsverk et al., 1996).

We limited our permanency analysis within children staying in foster care rather than those living in out-of-home placements. First, foster care is the most popular out-of-placement in child welfare system. Second, the Adoption and Safety Families Act of

1997 (ASFA) (PL 105-89) stresses that foster care is a temporary setting and that children in foster care need to find permanency placements faster than before. Third, the increasing number of children in foster care is responsible for increasing foster care costs (Ehrle, Scarcella, & Geen, 2004). Thus, it is important to find out the factors preventing permanency for foster care children.

Study limitations and lessons for future research

This study has several limitations. We used reports rather than substantiated cases to measure reabuse. Some reports may not reflect actual maltreatment. Conversely, of course, re-abuse is not always reported. Finally, because the reporting date is not available in current NSCAW data, we used the investigation date as the beginning of the time frame in modeling safety. Hence, the actual length of time to reoccurrence was under estimated. Furthermore, the time from the reporting date to the investigation date may vary across children. Thus, the length of time to reoccurrence is not fully accurate. It is not clear that such measurement error would influence the relative importance of the covariates included in the model, however.

Our study indicates that children's initial well-being may affect future safety and permanence. This finding implies that improving mental health may reduce repeated maltreatment and expedite permanence. Future studies may shed further light on the dynamics of the children's experience with changes in the children's well-being. For example, are there specific improvements in child functioning that are associated with greater improvements in safety and permanence? How might child and parent mental health improvements interact to yield even better safety and faster permanence?

Policy implications

We believe the first contribution of this study to be better empirical evidence for child welfare professionals about how mental health needs affect safety and permanence for maltreated children. Caseworkers are well aware of the need for early mental health screening and adequate services. However, nearly 10 percent of state and county child welfare agencies currently do not conduct the initial health assessment within 30 days, the standard established by the Child Welfare League Association (CWLA) (Inkelas & Halfon, 2002). Even among those conducting health assessment within the required time period, fewer than 60 percent of state and county child welfare agencies screen for mental health problems. Thus, this study provides further justification for the need for timely referral to mental health professionals and appropriate treatment.

Our findings on the effect of mental health status on permanence may also be relevant to policymakers because of current attention on time spent outside the home. Concerns about permanence have increased since the timeframes for making permanence planning decisions have been shortened from 18 to 12 months by the ASFA. As landmark federal child welfare legislation, the ASFA stresses the role of foster care as a temporary setting rather than a place for children to grow up. Our study showed that addressing children's mental health is essential to using foster care in this intended role. State child welfare directors have also cited the increasing number of children in foster care as a reason for increasing foster care costs (Ehrle et al., 2004). Proactively addressing factors affecting safety and permanence may reduce caseloads of foster care and kinship care and consequently reduce the financial burden of out-of-home placements.

Strengthening the coordination between child welfare and mental health systems will be essential to initiatives to improve the children's psychosocial functioning. Currently, public mental health agencies are generally not involved in procedures for assessment and treatment of children in foster care (Halfon et al., 2002a; Halfon et al., 2002b). Most mental health agencies are also not generally familiar with the key child welfare agency policies on mental health care or children in foster care (Halfon et al., 2002b).

Safety and permanence are the primary goals of child welfare. Children with mental health needs represent a large proportion of maltreated children in the child welfare system. From both policy and practice perspectives, it is necessary to address the association between children with mental health needs and their resulting safety and permanence.

CHAPTER THREE

**COORDINATION BETWEEN CHILD WELFARE AGENCIES AND
MENTAL HEALTH PROVIDERS, CHILDREN’S SERVICE USE,
AND OUTCOMES**

ABSTRACT

Insufficient interorganizational relationships (IORs) between child welfare and mental health providers may undermine mental health treatment access for vulnerable children. This study investigates whether IORs increase the use of mental health services and improve the mental health status for children served by child welfare system. This is a longitudinal analysis with 36 months follow-up data from the National Survey of Child and Adolescent Well-Being (NSCAW). The sample consists of 1,613 children within 75 child welfare agencies, who were 2 year old or above and had mental health problems at baseline. IOR intensity is measured as the number of coordination approaches between child welfare agencies and mental health providers. Weighted multilevel logistic regression model showed that agency level factors accounted for 14% of the variance in probability of service use and mental health improvement. Greater intensity of IORs was associated with higher likelihood of service use and mental health improvement. IORs are an effective means to improve children’s well-being.

Key words: mental health needs; IORs; intensity; child welfare; mental health services.

Background

The insufficient provision of mental health services to emotionally disturbed children in the child welfare system has been well documented (Burns et al., 2004; Glisson, 1996; Hurlburt et al., 2004; Trupin et al., 1993). Within the U.S. child welfare system, for instance, 42.4% of children were found to have mental health problems; however, only 28.3% received outpatient specialty mental health services (Hurlburt et al., 2004). Although many child welfare agencies provide mental health services, other agencies often provide at least some of the treatment children need. Inadequate interorganizational relationships (IORs) between child welfare and mental health providers thus may partly account for the substantial gap between needs and use of mental health services (Halfon et al., 2002a; Halfon et al., 2002b).

Combining child-level information from the National Survey of Child and Adolescent Well-Being (NSCAW) with county-level contextual measures, Hurlburt et al. (2004) was the first study to examine how inter-agency coordination affected use of mental health service with a nationally representative sample of children involved in child welfare. They measured IORs in terms of intensity, or the number of ties between each child welfare agency and mental health providers. The authors did not, however, examine whether coordination affected changes in children's psychological functioning over time. This issue is important because the goal of treatment is individual improvement. Moreover, having found similar results with and without random effects, the authors presented a final model that did not partition variance between agency and child-level factors. However, hierarchical modeling contributes to understanding the

importance of the unique role of child welfare agency management in affecting child-level outcomes.

Our study builds on Hurlburt et al. (2004) by applying multilevel modeling to trace inter-agency ties to both children's mental health status and mental health specialty services use over time. Our research questions were: Do child welfare agency IORs increase the use of mental health services for the children they serve? And do IORs improve children's mental health status? As in Hurlburt et al., the dimension of the IORs explored in this paper is intensity.

First, the literature on interagency coordination is reviewed. Next, the health care utilization model is introduced to contextualize how IORs may affect the use of medical service and health outcomes. Then the analysis approach is described. After results are presented, policy implications are discussed.

Literature Review

Most literature to date on child welfare has focused primarily on child-level factors related to mental health care use. A few studies have concentrated on agency coordination between mental health providers and child welfare (Glisson, 1994; Glisson & Hemmelgarn, 1998; Hurlburt et al., 2004). The first two of these studies investigated the effects of coordination on medical services and outcomes, while the last explored the effects of the intensity of coordination on children's use of mental health services.

Effects of coordination on uses of mental health services

Hurlburt et al. (2004) found that the intensity of coordination between local child welfare and mental health agencies strengthened relationships between Child Behavior Checklist (CBCL) scores and service use. In addition, coordination intensity was associated with decreased differences in service use between white and African American children. This finding implied that more intense interagency coordination could improve allocation of service resources to children with the greatest need.

Similar findings emerged from a previous a quasi-experimental study (Glisson 1994). The intervention entailed the addition of services coordination teams, consisting of child welfare, youth corrections, education, and mental health systems. The services coordination teams were responsible for assessing the children, referring them to the appropriate residential setting and needed services, and monitoring their progress while in custody. Children at intervention sites characterized by coordination teams were more likely to have received mental health services at the end of six months period compared with those in control areas. This finding suggested that coordination could increase use of medical services.

Effects of coordination on psychological functioning

There is less evidence that IORs among child-serving agencies improve children's psychosocial functioning. For instance, in the study cited above, children who entered custody with higher levels of disturbance experienced more progress in the intervention areas characterized by coordination teams than in the control area (Glisson 1994). Another study, however, did not find any effects of IORs on change in mental health

status (Glisson & Hemmelgarn, 1998). The authors examined the effects of organizational characteristics, including interorganizational coordination across child welfare, mental health, health, and educational services, on service quality and outcomes for two hundred and fifty children in state custody children's services systems over 3 years. In this study, interorganizational relationships were not associated with individual-level outcomes (e.g., CBCL).

Medical care service, health outcomes, and coordination between mental health system and other systems

Empirical findings beyond child welfare have also suggested that IORs could increase children's access to health care but have not found effects on clinical outcomes. The primary example is Systems of Care through which comprehensive spectrums of mental health and other services are coordinated to serve children and youth with serious mental health needs (Stroul & Friedman, 1986). In a longitudinal study of 350 children, Bickman et al (1999) found access to care, type of care, and amount of care increased for children in the System of Care. However, there were no differences in clinical outcomes (e.g., CBCL) compared to children outside the system. Another study which conducted additional follow-up for six months had the same finding (Bickman, Summerfelt, & Noser, 1997).

Similarly, a major study on an experiment based in Fort Bragg found that interagency coordination improved access to mental health services, reduced hospitalizations and restrictive forms of care, and improved satisfaction (Bickman, 1996; Bickman, Lambert, Andrade, & Penaloza, 2000; Lambert, Salzer, & Bickman, 1998).

However, clinical outcomes for children were not related to whether children were receiving services through Systems of Care or usual services.

Limitations of prior studies

Research to date has left some key questions unanswered. First, there is still limited information about how IORs between child welfare agencies and mental health providers influence children's mental health specialty service use. Only one study has specifically linked the intensity of IORs to service use (Hurlburt et al., 2004).

Second, although inter-agency coordination increased the use of mental health services, mixed results leave unclear whether coordination between child welfare and mental health providers could improve children's psychosocial functioning (Glisson et al. 1994, Glisson et al. 1998). Hurlburt et al (2004) did not investigate the role of coordination in improvement of children's mental health status because longitudinal data at other waves were unavailable at that time. Now additional data make it possible to examine the role of IORs in children's mental health over time.

Third, Glisson et al. (1994) and Glisson et al. (1998) measured IORs only in terms of case coordination. However, this form of coordination is only one of several types of potentially mutually reinforcing inter-agency ties, which may also include joint planning and resource allocation for service delivery at administrative level (Rogers & Whetten, 1982). Thus, examining case coordination only may lead to underestimation of overall IOR impact.

Fourth, some methodological limitations in previous studies may have affected results. For instance, models have not always controlled for demographic characteristics,

family risks, and maltreatment types in individual level analyses (Glisson, 1994; Glisson & Hemmelgarn, 1998). Those factors may influence health care access and utilization (Aday & Andersen, 1975; Burns et al., 2004; Hurlburt et al., 2004; Shin, 2005). Hurlburt et al (2004) used CBCL at Wave 1 as mental health needs to predict services uses in past 12 months. However, the CBCL only reflects behavior problems over the past 2 months (Achenbach & Edelbrock, 1991). Thus, with cross sectional data, Hurlburt et al. had to use "current" mental health status to predict “previous” service use. The current study contributes to this evolving literature by controlling for child and family covariates and by examining how service use affects subsequent mental health status.

Conceptual Framework

The health services utilization model is helpful for understanding the context within which interagency coordination between child welfare agencies and mental health providers may affect the services children receive and their mental health outcomes. This framework portrays multiple influences on medical service use and health status (Aday & Andersen, 1975; Aday, Gretchen, & Andersen, 1984; Andersen, 1995).

According to the health services utilization model, the probability of a child’s entry into the mental health system is influenced by the structure of the delivery system itself (e.g., the availability of mental health services and interaction between mental health providers and child welfare agencies), the child’s predisposing characteristics (e.g., age, gender, race/ethnicity, maltreatment types, family risks, placement settings, receipt of child welfare services, and nature of maltreatment report), individual and community enabling resources (e.g., health insurance and geographic location), and the needs they

may bring to the care-seeking process (such as manifested by a clinical CBCL score) (Figure 3.1). In turn, such mental health services may affect children's psychological outcomes. The health services utilization model also suggests that system-level factors may affect individual-level health status.

The focus in the current study is on the intensity of interagency connections, defined as the number of different types of linkages connecting two organizations. Such ties may occur at all levels of the respective organizations (Rogers & Whetten, 1982). Financial coordination such as joint budgeting or funding may occur at administrative levels. Similarly, joint development of policies and planning may occur at administrative levels. In contrast, services for clients such as intake, referral, and follow-up may be integrated by front line case workers. Information sharing could arise at all levels.

More intense inter-agency connections may enhance service efficiency, effectiveness, and continuity (Kusserow, 1991). Case-level coordination such as information sharing may facilitate early detection of children's needs of mental health and timely referral to mental health providers. System-level coordination such as cross-training, interagency agreement, joint planning, and joint budgeting may support case-level coordination through, for instance, making agency policies mutually compatible. Thus, we predicted that

Hypothesis 1: IORs intensity will be positively associated with the likelihood of mental health service use.

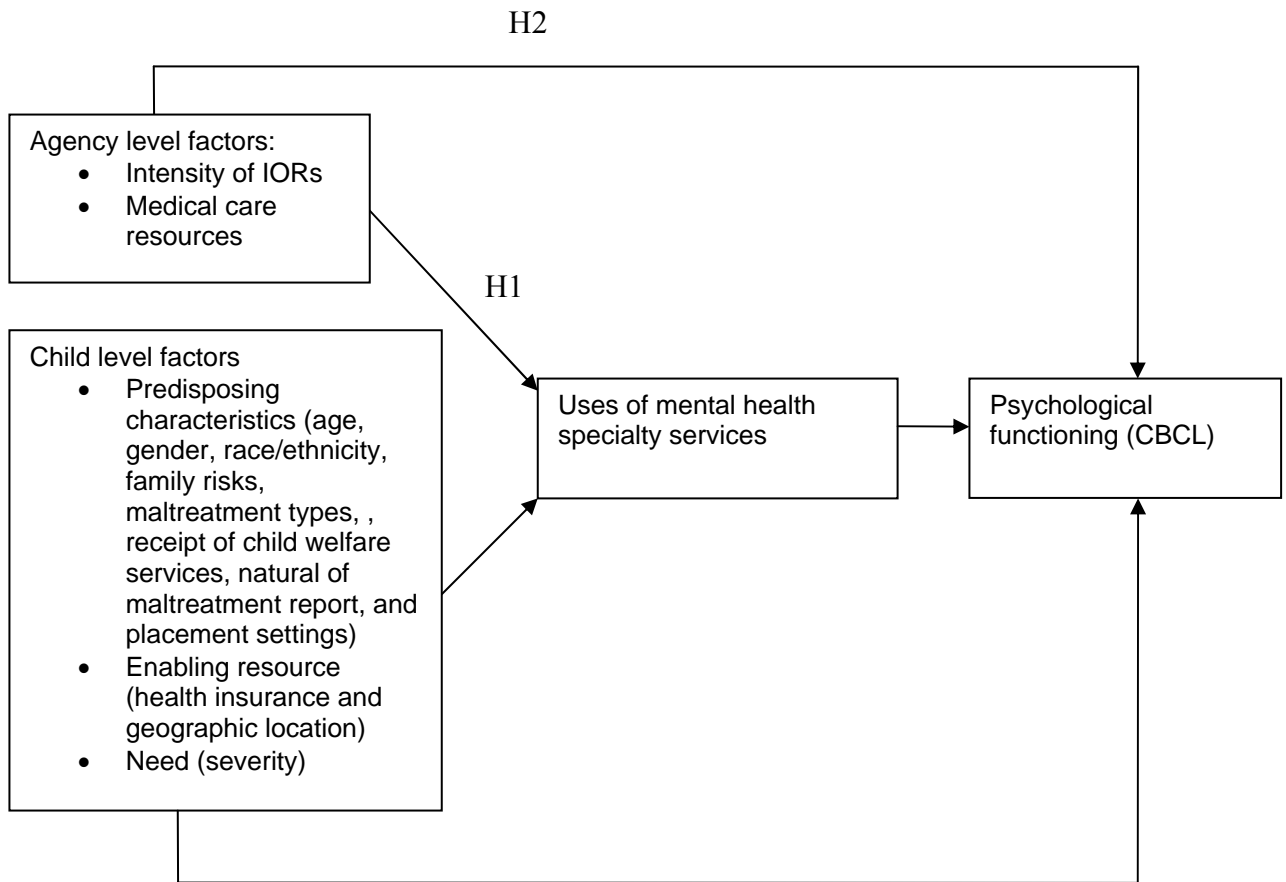
As noted earlier, the ultimate goal of IORs is to facilitate children's mental health improvement through timely and appropriate mental health services. More complete and continuous information exchanges should lead to prompt identification of children's

mental health problem and swifter subsequent recalibration of treatment plans. In turn, the relationship tactics children and parents learn through may further improve child psychological functioning by reducing family conflict (Hukkanen, Sourander, Bergroth, & Piha, 1999). Caseworkers may also apply the skills they learn from mental health providers through cross-training to help children and parents more effectively.

More intense IORs should also facilitate placement permanence, which is a major contributor to children's mental health status (Newton et al., 2000). Caseworkers and mental health providers are actively involved in placement recommendations/decisions (Butler, Atkinson, Magnatta, & Hood, 1995). Suggestions from both may significantly affect children's futures because children showed significant differences in mental health status after children were placed at different placements (Holtan, Ronning, Handegard, & Sourander, 2005; Keller et al., 2001). Informed medical and social support could also help children achieve placement stability. Overall, we expected that

Hypothesis 2: IORs intensity will positively associated with the likelihood of improvement in psychological functioning.

Figure 3.1: Applying the health services utilization model to mental health utilization and psychological outcomes for children in child welfare (Aday & Andersen, 1975; Aday et al., 1984; Andersen, 1995)



Methods

Data source

Data were drawn from the Child Protective Services (CPS) cohort of the National Survey of Child and Adolescent Well-Being (NSCAW). NSCAW is the first national study of child welfare to collect data from children and families and to relate child and family well-being to family characteristics, experience with the child welfare system, community environment, and other factors (Dowd et al., 2004). The children in the CPS sample were selected from U.S. children who were subjects of child abuse or neglect investigations (or assessments) conducted by child welfare agencies from October of 1999 through December of 2002. A two-stage stratified design was used to sample children in 92 primary sampling units at 48 states throughout the U.S. Interviews with each child, the current caregiver, and his or her child welfare worker were conducted at 2-6 months (Wave 1), at 12 month (Wave 2), at 18 months (Wave 3), and at 36 months (Wave 4) after the close of the investigation or assessment.

This two-stage probability design created a single weight for each NSCAW children. Weighting adjusted the estimates for the differential probabilities of inclusion in the sample: the probability of selecting the county of residence for the child and the probability of selecting the child given that child's county of residence was sampled (Dowd et al., 2004). Due to the sample probability weights, the resulting weighted estimates are approximately design-unbiased and consistent for the corresponding population quantities (Pfefferman, 1996). The use of sampling weights can protect against model misspecification.

Child welfare agency directors were interviewed at Wave 1 about agency cooperation with mental health providers, among a number of other topics. Some county-level information in the Area Resource Files of 2000, including population characteristics and medical resources, were also combined with NSCAW data using county identifiers.

Analytic samples

The study period was 36 months. The sample was comprised of children who were at least two years old at baseline, identified as having mental health problems at Wave 1 (total, externalizing, or externalizing CBCL score ≥ 64), and assessed again through the CBCL at Wave 4. The reason for the lower age limit is that the CBCL is only available for children 2 or above (Achenbach & Edelbrock, 1991). Among the 5,501 children in the overall sample, 1,613 were identified to have mental health needs at baseline. All those children completed CBCL assessment at Wave 4. Thus, the final sample size was 1,613, within 75 child welfare agencies.

Measures

Use of mental health services. Use of mental health services was the dependent variable for the model testing Hypothesis 1. At each wave, parents were asked whether their children had received any mental health services between the prior and current interviews. Mental health services included specialty outpatient, day treatment, therapeutic nursery, and private professionals (i.e., psychiatrists, psychologists, social workers, and psychiatric nurses). The CBCL was not available at Wave 2. Therefore, we

treated service use between Wave 2 and Wave 3 as 1 if the child had a mental health provider visit during Wave 2 or Wave 3.

Mental health improvement. Recalling that all children in this sample had clinical CBCL scores at baseline (i.e., ≥ 64), if all of three CBCL scores (total, externalizing, and internalizing) at Wave 4 were less than 64, that child was considered to have improved mental health status. The CBCL reflects a detailed picture of the child's behavior problems present or within past 2 months and has high reliability and validity (Achenbach & Edelbrock, 1991; Heflinger, Simpkins, & Combs-Orme, 2000). The use of a dichotomous measure (i.e., improve or not) rather than a continuous measure (i.e., CBCL score) is based on following reasons. First, we believe that the ultimate goal for service use is not only to control symptoms but also to cure disease. Second, the improvement or not is in fact more understandable than changes in scores. For example, people like to see children are free from mental health problems. It is hard for them to understand if the score is decreased by 4 or 5 points.

Intensity of IORs. Intensity of IORs was measured as the total number of different types of linkages connecting each child welfare agency with mental health providers. Types of ties were: joint budgeting or resource allocation, cross-training of staff, working with the agency on child welfare cases, development of interagency agreement and memoranda of understanding, joint planning/policy formulation for service delivery, discussion and information sharing, and 'other' approaches.

Other variables. Covariates in this study included child level measures such as demographic characteristics (age, gender, and race/ethnicity), maltreatment type, health insurance coverage, placement settings, receipt of child welfare services, whether the

child lived in an urban or rural county, the family's overall risk level, and whether or not there had been a substantiated maltreatment report (Table 3.1). Agency level information was also considered in the models. The availability of mental health services in the agency's county was measured by the total number of mental health professionals per 100,000 children (i.e., general psychiatrists, child psychiatrists, and psychologists) and the number of community mental health centers per 100,000 children.

Table 3.1 Variables and their categories

Variables	Definition
Use of mental health services	Yes if child had a mental health provider visit during Wave 2 or Wave 3. Mental health services included specialty outpatient, day treatment, therapeutic nursery, and private professionals (i.e., psychiatrists, psychologists, social workers, and psychiatric nurses).
Mental health improvement	Yes if CBCL standard scores (total, externalizing, and internalizing) at Wave 4 are less than 64
Age group	2-5 yrs, 6-10 yrs, and ≥ 11 yrs
Gender	Boy and girl
Race/ethnicity	non-Hispanic black, non-Hispanic white, Hispanic, and other races
Maltreatment type	Physical maltreatment, sexual maltreatment, neglect, and other types of maltreatment
Insurance status	Medicaid, private insurance, and others (e.g., self-pay and other insurance)
Placement settings	In-home setting, foster care, kinship care, group home/residential program, and others
Receipt of services ^a	Yes if a child received child welfare services at baseline
Geographic location ^b	Rural and urban
Risk level ^c	Low, medium, and high
Substantiated maltreatment case	Yes if a child's maltreatment report which occurred right before NSCAW survey was substantiated
IOR intensity	Number of interagency activities
Total medical professionals	Number of mental health professionals per 100,000 children (i.e., general psychiatrists, child psychiatrists, and psychologists)
Total mental health care centers	Number of community mental health centers per 100,000 children

^a After child welfare finished maltreatment investigation, some children were not received child welfare services.

^b Definition of rural and urban is provided by the Area Resource File (see <http://www.arfsys.com>).

^c It is a percentile scale of cumulative risks, which are examined by caseworker in Risk Assessment section of NSCAW. These risks include child poor ability to self-protect, child special needs, caregiver's substance abuse, caregiver's mental health problems, caregiver's recent law involvement, caregiver's history of abuse or neglect, parenting, high stress on family, low social support, reasonable level of cooperation between caseworker and caregiver, and etc.

Analyses

Since the dependent variables were binary, two-level weighted logistic regression models were used to test the research hypotheses, with children at Level 1 and child welfare agencies at Level 2. First, the unconditional model (Model 1) indicated the percentage of total variance in each outcome attributable to agency level factors. If the percentage was very small, it would indicate that the agency effect was ignorable; otherwise, agency-level factors should be added as a separate level in the model. Model 2 added child-level measures at Level 1. Finally, Model 3 also included agency-level variables, at Level 2 (See Appendix).

We hypothesized that greater IOR intensity between child welfare agencies and mental health providers would be related to greater probability of both mental health improvement and mental health services use. Thus, we expected that odds ratio of intensity of IORs would be significantly greater than 1.

The software package to analyze our longitudinal data with a hierarchical structure (e.g., individuals nested within a child welfare agency) was GLLAMM supported by Stata 9.2. This package estimates model coefficients at each level and predicts the random effects associated with each sampling unit at each level, allowing for probability weights (Rabe-Heskech & Skrondal, 2005).

Results

Descriptive analysis

Table 3.2 displays the characteristics of children in the analytic sample, all of whom had one or more CBCL scores of 64 or higher at baseline. CBCL scores for more than half of these children fell below 64 by Wave 4 (54.4%). Just over half (55.6%) of the sample of children identified as needing mental health services at wave 1 received such services during the study period. There were slightly fewer girls (48%) than boys in the sample. The ages of the children at baseline ranged from 2 to 14 years old: 23.8% were from 2 to 5, 39.6% were from 6 to 10, and 36.6% were above 10. The sample was 50.1% non-Hispanic white, 26.3% non-Hispanic black, 17.0% Hispanic, and 6.6% of other race/ethnicity. County mental health service resources are also reported in Table 3.2.

Agency and county characteristics are reported in Table 3.3. The number of IORs between child welfare agencies and mental health providers ranged from 0 to 7 with an average of 3.8 (SD=2.0). The average child welfare agency was in a county with one (1.1) mental health center and a total of 876 medical professionals.

Table 3.2: Child characteristics among NSCAW children who had clinical Child Behavior Checklist scores (>63) at baseline

	Unweighted frequency (n=1,613)	Weighted percent
Mental health status		
Improved	794	54.4
Not improved	819	45.6
Use of mental health services		
Yes	793	55.6
No	820	44.4
Age		
2-5	353	23.8
6-10	659	39.6
>=11	601	36.6
Gender		
Boy	817	52.0
Girl	796	48.0
Race		
Non-Hispanic White	791	50.1
Non-Hispanic Black	462	26.3
Hispanic	240	17.0
Other races	120	6.6
Maltreatment types		
Physical maltreatment	411	27.9
Sexual abuse	289	12.9
Neglect	570	40.6
Other maltreatments	343	18.6
Health insurance status		
Medicaid	1,140	65.3
Private	461	34.0
Selfpay	12	0.7
Placements at baseline		
In-home setting	1,174	87.6
Foster care	208	4.9
Kinship care	142	3.9
Other places	89	3.6
Family risks ^a		
Low	439	42.9
Medium	494	33.9
High	578	23.2
Receipt of child welfare services		
Yes	1,213	30.2
No	400	69.8

Table 3.2: Characteristics of NSCAW children who had clinical CBCL at baseline (cont'd)

	Unweighted frequency (n=1,613)	Weighted percent
Substantiated maltreatment case		
Yes	831	74.7
No	782	25.3
Living in urban areas		
Yes	1,186	71.6
No	427	28.4

^a102 observations have missing values.

Table 3.3: Child welfare agency and agency service area characteristics

	N	Mean	S.D.
Number of IORs	75	3.8	2.0
Total mental health care centers	75	1.1	1.9
Total medical professionals	75	875.9	644.9

Multilevel logistic regression model on use of mental health services

The unconditional model showed that the proportion of variance explained at Level 2 was 14.1% ($0.141=0.54/(0.54+\pi^2/3)$) (Table 3.4). Level-1 variance in multilevel logistic model is $\pi^2/3$, the variance for a standard logistic distribution (Browne, Subramanian, Jones, & Goldstein, 2005; Guo & Zhao, 2000; Hedeker, 2003). This 14.1% indicated that the agency effect was not ignorable.

The number of IORs was positively related to the odds ratio of mental health services use (OR=1.04, $p=0.004$) (Table 3.4). For every additional type of tie with mental health agencies the likelihood of mental health services use for individual children increased by 4%. This finding supported Hypothesis 1. Use of mental health services was also significantly related to many other factors, such as severity of mental health status at baseline (i.e., higher initial CBCL scores), being male or older, out-of-home placements (i.e., foster care and kinship care), high family risk, rural location, and unsubstantiated cases. In addition, local medical resource availability had mixed effects on use of mental health services.

Table 3.4: Weighted multilevel logistic model of IORs on use of mental health service ^a

Use of mental health services	Model 1 (unconditional model)			Model 2 (add child-level variables)			Model 3 (add agency level variables)		
	OR	95% CI	P	OR	95% CI	P	OR	95% CI	P
<i>Child level</i>									
Severity (centered CBCL)				1.17	(1.13,1.22)	0.000	1.16	(1.12,1.21)	0.000
Boy				2.20	(1.13,4.29)	0.018	3.03	(1.36,6.78)	0.007
Age 6-10				2.34	(1.30,4.21)	0.004	2.34	(1.23,4.47)	0.011
Age 11+				5.21	(3.13,8.67)	0.000	6.42	(3.57,11.57)	0.000
Non-Hispanic Black				0.60	(0.31,1.17)	0.141	0.53	(0.23,1.22)	0.140
Hispanic				1.40	(0.95,2.08)	0.084	1.25	(0.83,1.88)	0.295
Other race				1.22	(0.58,2.57)	0.604	0.93	(0.36,2.44)	0.883
Sexual abuse				1.63	(0.84,3.18)	0.147	1.82	(0.59,3.48)	0.074
Neglect				1.19	(0.73,1.93)	0.499	1.30	(0.93,1.81)	0.123
Other maltreatment				1.63	(1.06,2.51)	0.028	1.70	(1.10,2.61)	0.015
Private insurance				0.82	(0.53,1.26)	0.378	0.73	(0.38,1.40)	0.341
Selfpay				1.01	(0.34,3.03)	0.991	1.04	(0.23,4.80)	0.962
Foster care				3.42	(1.69,6.93)	0.001	2.75	(1.56,4.85)	0.001
Kinship care				3.00	(1.45,6.20)	0.003	3.42	(1.23,9.48)	0.017

Table 3.4: Weighted multilevel logistic model of IORs on use of mental health service^a (cont'd)

Use of mental health services	Model 1 (unconditional model)			Model 2 (with child-level variables)			Model 3 (with agency level variables)		
	OR	95% CI	P	OR	95% CI	P	OR	95% CI	P
Group home and others				1.70	(0.40,7.25)	0.477	1.51	(0.36,6.30)	0.572
Medium risks				0.80	(0.65,0.99)	0.034	0.70	(0.51,0.96)	0.024
High risks				1.52	(1.13,2.04)	0.006	2.46	(1.51,4.01)	0.000
Urban				0.84	(0.73,0.96)	0.009	0.88	(0.68,1.13)	0.342
Receipt of child welfare service				0.98	(0.66,1.45)	0.938	0.98	(0.74,1.29)	0.877
Substantiated case				0.44	(0.26,0.76)	0.003	0.45	(0.27,0.77)	0.004
Agency/county level									
Number of mental health care professionals in county per 100,000 children							1.01	(1.01,1.02)	0.000
Number of mental health centers in county per 100,000 children							0.94	(0.92,0.96)	0.000
Intensity of IORs with mental health agencies							1.04	(1.02,1.06)	0.004
Variance components^b									
Level-2	0.54			0.35			0.32		

^aReference groups are girl, age 2-5, non-Hispanic white, physical maltreatment, Medicaid, in-home setting, low risks, rural areas, not receiving child welfare service, and not a substantiated case.

^bLevel-1 variance of multilevel logistic model is $\pi^2/3$.

Multilevel logistic regression model on improvement of mental health status

The unconditional model showed that the proportion of variance explained at Level 2 was 14.8% ($0.148 = 0.57 / (0.57 + \pi^2/3)$). Again, this indicated that the agency effect was not ignorable.

The intensity of child welfare agency ties with mental health agencies was positively related to improved mental health status by the end of the study period (OR=1.04, $p=0.043$) (Table 3.5). For every additional type of IOR, the likelihood of mental health status improvement increased by 0.04. Thus, this result supported Hypothesis 2. Mental health improvement was also significantly related to many other factors, such as severity of mental health status at baseline (i.e., lower initial CBCL scores), ethnicity, out-of-home placements (i.e., kinship care and group home), family risks, urban location, and unsubstantiated cases. Particularly, services use was a predictor of less likelihood of mental health improvement. Moreover, health care resources were negatively associated with psychological functioning improvement.

Table 3.5: Weighted multilevel logistic model of IORs on improvement of mental health status ^a

Improvement of mental health status	Model 1 (unconditional model)			Model 2 (add child-level variables)			Model 3 (add agency level variables)		
	OR	95% CI	P	OR	95% CI	P	OR	95% CI	P
<i>Child level</i>									
Receipt of mental health specialty services				0.43	(0.29,0.63)	0.000	0.42	(0.24,0.75)	0.003
Severity (centered CBCL)				0.88	(0.84,0.91)	0.000	0.87	(0.82,0.92)	0.000
Boy				1.16	(0.94,1.44)	0.169	1.26	(0.98,1.62)	0.082
Age 6-10				1.51	(0.85,2.66)	0.162	1.72	(0.88,3.34)	0.112
Age 11+				1.65	(0.88,3.09)	0.114	1.63	(0.85,3.12)	0.132
Non-Hispanic Black				0.94	(0.58,1.54)	0.815	1.16	(0.62,2.18)	0.654
Hispanic				3.42	(2.22,5.27)	0.000	3.60	(2.79,4.64)	0.000
Other races				1.11	(0.49,2.47)	0.811	1.40	(0.49,4.05)	0.524
Sexual abuse				0.58	(0.34,1.01)	0.057	1.28	(0.76,2.18)	0.343
Neglect				0.93	(0.61,1.44)	0.753	1.14	(0.74,1.75)	0.563
Other maltreatment				1.01	(0.59,1.71)	0.984	1.15	(0.78,1.70)	0.492
Private insurance				0.86	(0.48,1.55)	0.607	1.11	(0.54,2.38)	0.791
Selfpay				0.70	(0.13,3.80)	0.679	0.66	(0.15,2.89)	0.585
Foster care				0.91	(0.35,2.39)	0.859	0.90	(0.21,3.86)	0.898

Table 3.5: Weighted multilevel logistic model of IORs on improvement of mental health status^a (cont')

Improvement of mental health status	Model 1 (unconditional model)			Model 2 (add child-level variables)			Model 3 (add agency level variables)		
	OR	95% CI	P	OR	95% CI	P	OR	95% CI	P
Kinship care				2.89	(1.29,6.45)	0.010	3.46	(2.08,5.75)	0.000
Group home and others				3.60	(1.43,9.04)	0.007	8.50	(3.81,18.98)	0.000
Medium risks				1.28	(0.88,1.86)	0.175	1.16	(0.67,2.01)	0.605
High risks				0.86	(0.55,1.35)	0.509	0.51	(0.37,0.70)	0.000
Urban				1.27	(1.02,1.58)	0.034	1.45	(1.26,1.66)	0.000
Receipt of child welfare service				0.66	(0.44,0.99)	0.047	0.58	(0.34,1.01)	0.055
Substantiated case				0.47	(0.24,0.89)	0.021	0.28	(0.16,0.51)	0.000
Agency Level									
Number of mental health care professionals in county per 100,000 children							0.99	(0.98-0.99)	0.000
Number of mental health centers in county per 100,000 children							0.94	(0.91,0.98)	0.001
Intensity of IORs with mental health agencies							1.04	(1.01,1.08)	0.043
Variance components^b									
Level-2	0.57			0.49			0.32		

^a Reference groups are not receiving mental health services, girl, age 2-5, non-Hispanic white, physical maltreatment, Medicaid, in-home setting, low risks, rural, not receiving child welfare service, and not a substantiated case.

^b Level-1 variance of multilevel logistic model is $\pi^2/3$.

Discussion

This study determined whether IOR intensity facilitated use of mental health services and improvement of psychological functioning among children served by child welfare. We hypothesized that higher intensity IORs would be positively related to greater likelihood of services use and mental health improvement. Our results supported both hypotheses: higher intensity IORs increased the likelihood of mental health services use and psychological improvement. In addition, our variance components analysis showed significant agency effects.

Coordination between child welfare and mental health providers is often necessary, yet little is known about how these types of agencies work together and what outcomes are thereby achieved. Our study is the first one to use nationally representative data to investigate the effects of IORs between child welfare agencies and mental health providers on service use and psychological functioning for children over time. This study is also the first one to evaluate the magnitude of agency-level effects on psychological changing among child welfare children, finding that in this instance at least agency-level effects were not ignorable. Another contribution is measurement of IORs at both case management and administrative levels.

Although it is reasonable to assume that service use at least partially mediates the association between IORs and child improvement, this analysis was beyond the scope of the current study. There is also reason to believe that some of the association between IOR intensity and children's psychological functioning may be due to factors besides mental health service use. For instance, IORs may lead to more informed placement decisions that in turn support better children's mental health (Holtan et al., 2005; Keller

et al., 2001). Better placement decisions which are more appropriate for the children may be more stable over time and thus more supportive of long term mental health (Newton et al., 2000). Caseworkers may also use better information about children's progress to support more effective case plans, which in turn may support better parent-child relationships and thus child well-being over time (Hukkanen et al., 1999).

This study has several limitations. First, we were unable to test the stability of child welfare-mental health agency IORs over time because we only had this measure at baseline. Second, this study does not fully explore the causal chain between agency IORs and changes in children's mental health status. Future studies should clarify how IORs affect children and their families over time.

Children involved in child welfare services frequently have health problems which require evaluation and treatment services from multiple providers. Timely and appropriate mental health services are especially important for maltreated children, given the potential for abuse to affect development over time (English, 1998). The current study provides evidence that more intense inter-agency coordination can lead to both more service access and better child outcomes. We hope that this and additional studies will provide an evidence basis for inter-agency coordination that better meets the needs of vulnerable children.

Appendix

Model 1 (unconditional model)

At Level 1,

$$\text{Prob}(Y=1|B) = P$$

$$\text{Log} [P/(1-P)] = B0 + e$$

At Level 2,

$$B0 = R0 + u0$$

Model 2 (add child-level factors)

At Level 1,

$$\text{Prob}(Y=1|B) = P$$

$$\begin{aligned} \text{Log} [P/(1-P)] = & B0 + B1*(PSUURBAN) + B2*(BOY) + B3*(SERVICE) + B4*(SUBSN) + \\ & B5*(AGE6_10) + B6*(AGE11) + B7*(BLACK) + B8*(HISPANIC) + B9*(OTHRACE) + \\ & B10*(SXABUSE) + B11*(NEGABUSE) + B12*(OTHABUSE) + B13*(PRIVATE) + \\ & B14*(SELPAY) + B15*(FSTCARE) + B16*(KINSCARE) + B17*(GRPHOME) + \\ & B18*(MEDIUM) + B19*(HIGH) + B20*(SEVERITY) + e \end{aligned}$$

At Level 2,

$$B0 = R0 + u0$$

Model 3 (add agency-level factors)

At Level 1,

$$\text{Prob}(Y=1|B) = P$$

$$\begin{aligned} \text{Log} [P/(1-P)] = & B0 + B1*(PSUURBAN) + B2*(BOY) + B3*(SERVICE) + B4*(SUBSN) + \\ & B5*(AGE6_10) + B6*(AGE11) + B7*(BLACK) + B8*(HISPANIC) + B9*(OTHRACE) + \\ & B10*(SXABUSE) + B11*(NEGABUSE) + B12*(OTHABUSE) + B13*(PRIVATE) + \\ & B14*(SELPAY) + B15*(FSTCARE) + B16*(KINSCARE) + B17*(GRPHOME) + \\ & B18*(MEDIUM) + B19*(HIGH) + B20*(SEVERITY) + e \end{aligned}$$

At Level 2,

$$B0 = R0 + R1*(IORs) + R2*(Professionals) + R3*(MH centers) + u0$$

CHAPTER FOUR

What organizational factors affect the number of ties between child welfare agencies and mental health providers?

ABSTRACT

Objective: Cooperation between child welfare and mental health agencies can contribute to more use of specialty mental health services and improved children's mental health. Better understanding of what factors predict greater inter-agency cooperation may offer insights into how to encourage such cooperation. This study sought to identify organizational factors associated with higher numbers of inter-agency ties.

Method: This is a cross-sectional study with 86 child welfare agencies whose directors were interviewed through the National Survey of Child and Adolescent Well-Being (NSCAW). Inter-agency relationship (IOR) intensity was measured by the number of coordination approaches between each child welfare agency and mental health providers. Five organizational predictors of IORs were investigated: the child welfare agency's services scope, agency size, organizational affiliation, fiscal resources, and IORs with schools and the judicial system.

Results: Poisson regression revealed that a greater number of IORs with schools and with the judicial system significantly predicted intensity of IORs between child welfare agencies and mental health providers. No other agency attribute examined was associated with the number of ties with mental health providers.

Conclusion: Child welfare agencies appear to cooperate more extensively with mental health agencies in part because of a general affinity for cooperation. Agencies with more ties to other child-serving organizations might share strategies with their peers that encourage those other child welfare agencies to cooperate more actively as well.

Key words: IORs; intensity; mental health services; child welfare.

Background

Efforts to control and integrate work activity across organizational boundaries, commonly referred to as interorganizational relationships (IORs), are key elements in the design of public service systems (Gans & Horton, 1975). In child welfare, coordination with other health and human services is vital because children and their families have needs for which multiple agencies have responsibility (U.S. Department of Health and Human Services, Administration on Children, & Youth and Families, 2004). For instance, given that children in child welfare agencies have a disproportionately high prevalence of mental disorders (Hurlburt et al., 2004; Shin, 2005; Trupin et al., 1993) and that children with mental disorders often receive inadequate mental health services (Burns et al., 2004; Glisson, 1996; Hurlburt et al., 2004; Trupin et al., 1993), child welfare agencies may need to supplement their services with those of mental health care providers.

IORs among health care and social services providers seek to eliminate fragmentation, gaps in services, and unnecessary duplication and to enhance delivery of services (Kamerman & Kahn, 1976). Although the evidence is mixed, there is some evidence that interagency cooperation can contribute to greater use of specialty mental health services (Glisson, 1994; Hurlburt et al., 2004) and improved mental health status (Glisson, 1994). This finding raises the question of what types of child welfare agencies are more active in cooperating with local partners. To measure this outcome, we use intensity of child welfare agency ties with one key partner – mental health providers.

Previous evidence has suggested that greater numbers of ties among partners can facilitate organizational effectiveness (Provan & Sebastian, 1998) and decrease the level of conflicts (Alter, 1990). Coordination may entail information, resources, clients, and

programs (Klonglan, Warren, Winkelpleck, & Paulson, 1976). For instance, coordination between child welfare and mental health agencies may include children' maltreatment and medical reports, other relevant information, funds and materials (e.g., through joint budgeting and resource allocation), cross-training of staff, ongoing individual case coordination, shared inter-agency activities, and joint planning and service delivery. When multiple coordination strategies are employed different hierarchical levels of each organization become involved (Klonglan et al., 1976). For example, case management is generally coordinated among front line staff, whereas planning and programming linkages are developed among supervisors and administrators. Thus, when IORs entail more types of coordination more channels develop to share resources (e.g., information, financial resource, and personnel) and solve problems. For instance, agency-level initiatives such as cross-training staff may reinforce efforts by individual staff members to coordinate case management because they learn more about each other's organizational and professional perspectives.

Given some evidence that more intense IORs between child welfare agencies and mental health providers facilitate access to health care (Hurlburt et al., 2004) and improvement of psychological functioning for children served by child welfare (Glisson, 1994), it is important to understand when more intense inter-agency cooperation would occur. The objective of this study is to explore associations between child welfare agencies' organizational attributes and the intensity of IORs between child welfare agencies and mental health providers.

Theoretical Approach

A variety of organizational characteristics may affect interorganizational ties (Rogers & Whetten, 1982; Schermerhorn, 1975). Here five of the most salient potential predictors are discussed: scope of service, organizational size, organizational affiliation, fiscal resource, and extensiveness of IORs with other organizations (i.e., education system and juridical justice system).

First, the broader the scope of service in interorganizational system, the more interorganizational cooperation may be necessary. For instance, a previous study of 15 interorganizational service delivery systems in two states found that the intensity of the IORs was positively associated with service scope (Alter, 1990). The provision of a wide range of services may be recognized as a complex process that probably inevitably entails conflict. Alter (1990) found that both coordination and conflict in interagency service delivery systems existed simultaneously and were positively related to one another. Thus, having more cooperative working arrangements may help control conflict.

Hypothesis 1: The scope of services child welfare agencies provide will be positively related to the intensity of IORs between child welfare agency and mental health providers.

Second, organizational size may affect the nature of IORs (Osborn & Baughn, 1990). Larger organizational size may facilitate more interagency relationships because large agencies are generally responsible for referring large number of clients and distributing funds to other agencies. Moreover, large agencies may provide leadership in community planning activities. For example, Banaszak-Holl et al (1998) found that social

services with more employees had more interagency ties (e.g., information sharing and joint funding).

Hypothesis 2: Child welfare agency size will be positively related to the intensity of IORs between child welfare agency and mental health providers.

In addition, organizational resources also may affect IOR intensity by already providing necessary resources, technical complementarity, economics of scale, or legitimacy. If a child welfare agency is a unit in a larger agency rather than a free-standing entity in the community, their clients may receive services from other units in this agency. In the related field of substance abuse treatment, units based in hospitals or mental health centers were less likely to engage in IORs than were freestanding units (Wells, Lemak, & D'Aunno, 2005). Similarly, Banaszak-Holl et al (1998) found that being a unit of another organization was a negative predictor of interorganizational activities.

Hypothesis 3: Child welfare agencies that are free-standing rather than units within larger agencies will have more intense IORs with mental health providers.

Fourth, fiscal pressure may encourage IORs as a means of improving cost-effectiveness through economies of scale (Oliver, 1990; Wells et al., 2005). Agencies with fewer resources may therefore be inclined to have more ties with other agencies as a means of leveraging their limited resources.

Hypothesis 4: Child welfare agency financial resources will be negatively associated with the intensity of IORs with mental health providers.

Finally, interagency activities with one type of organization may facilitate more active IORs with other organizations. Administrators whose agencies have existing IORs may thereby gain appreciation of the value of coordination as well as feel more comfortable developing other interagency ties. A previous study found that agencies with prior experiences in either networking or provision of case management services were more likely to participate in community care networks (Guihan, Manheim, & Hughes, 1995). Since children in child welfare system have multiple needs, child welfare agencies may pursue IORs with multiple social service systems, such as mental health, education, and juvenile justice system (Greenbaum et al., 1996; Howell, Kelly, Palmer, & Mangum, 2004). Therefore, interagency ties between child welfare agencies and mental health providers are more likely to occur for those with preexisting IORs, such as interactivity between child welfare agencies and school/juvenile justice system.

Hypothesis 5: Child welfare agencies that have ties to other types of health and human service providers will have more intense IORs with mental health providers.

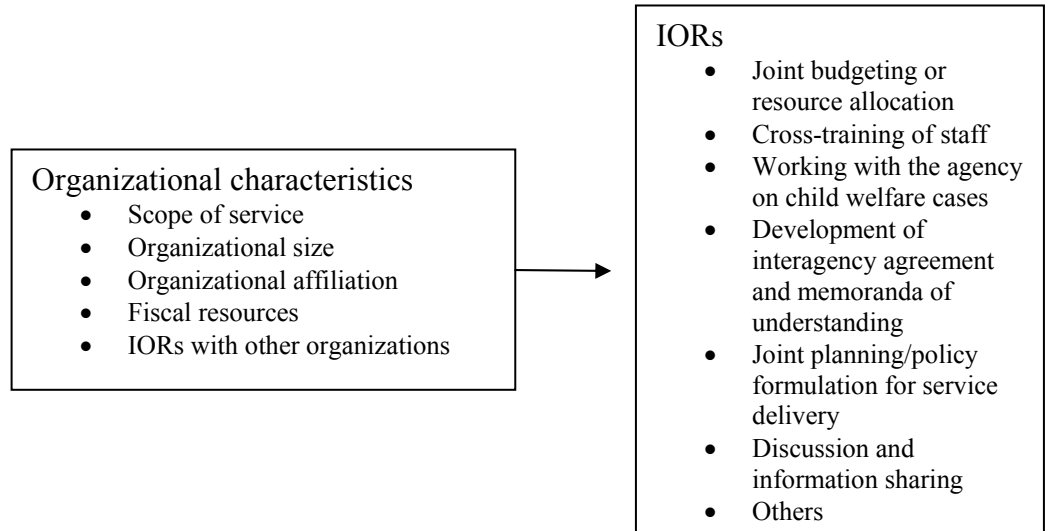
Contextual factors

Beyond organizations' internal attributes, environment factors may also affect the intensity of coordination activities (Schermerhorn, 1975; Wells et al., 2005; Whetten & Aldrich, 1979). For instance, certain client characteristics are associated with more complex treatment and service needs. One way to address these needs is to coordinate with other organizations. Wells et al (2005) found that diverse client populations were a positive predictor of IOR formation by substance abuse treatment units. Another important environmental factor is the supply of potential partners. In this instance, the

availability of mental health providers within child welfare agency service areas may affect the opportunity for such coordination.

In summary, organizational characteristics may have effects on the IORs (Figure 4.1). Several lessons may be drawn from the literature review. Previous research has revealed little about how organizational characteristics affect child welfare agencies' interagency activities. Findings in this context could contribute to facilitation or more robust IORs among child-serving agencies. In addition, previous studies have not included some critical factors in their analyses. For example, economic indicators were overlooked in the study of Alter (1990). However, economic factors (e.g., budget constraint or needs for cost-effectiveness) may play an important role in interorganizational connections (Oliver, 1990; Reitan, 1998; Ring & Van De Ven, 1994). Failure to consider such important factors may threaten the validity of study conclusions.

Figure 4.1: Theoretical model of IORs between child welfare agencies and mental health providers



Method

Data source

Data were drawn from the National Survey of Child and Adolescent Well-Being (NSCAW): the Local Agency Director Interview and the Self-Administered Questionnaire. Both were conducted during 1999 to 2000 and were completed by child welfare agency directors in each primary sampling unit (PSU). This represents a nationally representative sample of public child welfare agencies. This stratified random sample is comprised of 92 public child welfare agencies across the United States (Dowd et al., 2004). Both questionnaires included questions focusing on organizational structure, fiscal resource, staffing and training, foster care resources, and service activities for the most recent fiscal year.

Research design and sample

The study used a cross-sectional design. Among 92 child welfare agencies, 86 agency directors completed the LADI and the SAQ, representing 93.5% of all agencies in the initial LADI/SAQ sample. The unit of analysis was the agency.

Variables, measures, and analysis method

The child welfare agency directors were asked which type(s) of collaboration they had with mental health service providers: discussion and information sharing, joint budgeting or resource allocation, cross-training of staff, working with the agency on child welfare cases, development of interagency agreement and memoranda of understanding, joint planning/policy formulation for service delivery, and other approaches. Our

dependent variable, the intensity of IORs, was derived from these prompts as a count variable with a range from 0 to 7.

According to the hypotheses, organizational characteristics (i.e., scope of service, organizational size, organizational affiliation, fiscal resource, and IORs with other types of child-serving agencies) were entered as independent variables. Scope of services was measured by the number of services child welfare agencies provided. Organizational size was measured by number of full-time employees. Organizational affiliation was defined as whether the organization was embedded in a larger agency. Financial status was assessed by total yearly expenditure and average total expenditure per report. IORs with the educational system and judicial justice system respectively were each also measured as counts as the number of ways the child welfare agency coordinated with each. Contextual variables included client characteristics (i.e., percent of children with mental disorders) and availability of medical professionals (i.e., number of mental health professionals and number of health care facilities) (Table 4.1).

Generalized linear modeling (GLM) with poisson regression is customarily used to model the number of counts (occurrences) of an event (McCullagh & Nelder, 1983). Here it was conducted to test the hypotheses that selected organizational factors would predict higher intensity of IORs. Because 19.5 percent of the cases were missing one or more variables of interest in the data set (Table 4.2), multiple imputation method was applied. Multiple imputation was conducted using IVEware running in SAS 9.1. All other analyses were performed using Stata 9.2.

Table 4.1: Variables and their measures

Variables	Measures
Organizational characteristics	
Scope of service	Number of practices for service delivery
Organizational size	Total filled Full Time Equivalent (FTE) positions during the fiscal year
Organizational affiliation	A unit within a large agency (1=Yes, 0=No)
Fiscal resource	<ol style="list-style-type: none"> 1) Total yearly expenditure 2) Average total expenditure per report
IORs with other organizations	<ol style="list-style-type: none"> 1) Number of connection ties with education system 2) Number of connection ties with judicial justice system
Community characteristics	
Client characteristics	Percent of child welfare children with clinical CBCL
Medical care availability	<ol style="list-style-type: none"> 1) Total mental health professionals (e.g., psychologists, psychiatrists, and child psychiatrists) per 100,000 children (0-17) in county 2) Total medical facilities (e.g., mental health center and federal qualified hospitals) per 100, 000 children (0-17) in county

Results

Descriptive analysis

The number of connections between child welfare agencies and mental health providers ranged from 0 to 7 (mean=3.9, SD=1.9) (Table 4.2). Nine out of eighty-six child welfare agencies did not have any interagency activities with mental health providers at all (see Figure 4.2). Moreover, 7 of 86 agencies had only 1 or 2 ties with mental health providers. This suggests that 18.6 percent (16/86) of child welfare agencies have none/low intensity IORs with mental health providers.

Table 2 presents the organizational and contextual characteristics of child welfare agencies. The mean total services child welfare agency provided was 2.37 (SD=1.90). The mean number of caseworkers per agency was 338.76 (SD=931.94). Sixty-five child welfare agencies were affiliated with a larger agency. The mean expenditure per report was more than 8,500 dollars. Finally, the average number of IORs between child welfare agencies and education system was 3.1 (SD=1.69) and the average number of IORs between child welfare agencies and judicial justice system was 3.57 (SD=2.11).

The correlation matrix shows significant bivariate associations between intensity of IORs with mental health providers and the number of ties with other organizations, total services child welfare agencies provided, and total yearly expenditure (Table 4.3).

Figure 4.2. Distribution of number of coordination approaches between child welfare agencies and mental health providers

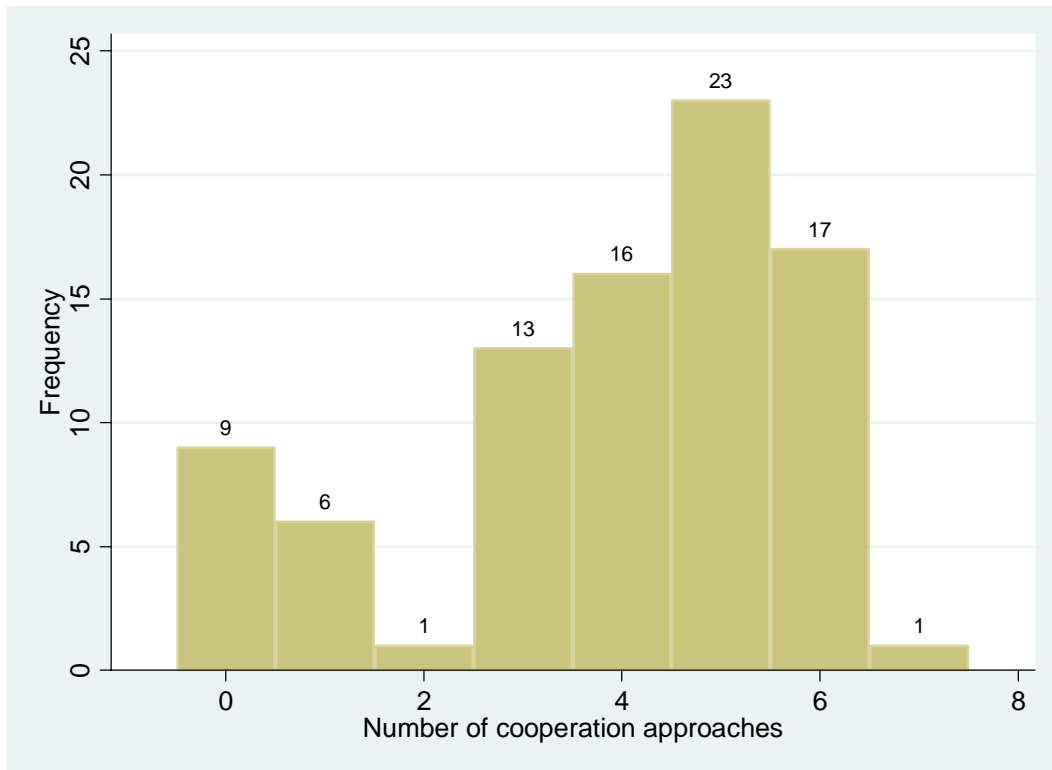


Table 4.2: Characteristics of child welfare agencies

	N	Mean	Std. Dev.	Min	Max
IOR with mental health agencies	86	3.90	1.92	0.00	7.00
Total services	86	2.37	1.90	0.00	6.00
Total caseworkers	39	338.76	931.94	2.50	5660.00
Within a public health entity	83	0.78	0.41	0.00	1.00
Total expenditure	43	3.88	0.54	1.00	4.00
\$ per children	41	8515.43	10181.28	47.72	43702.62
IOR with school	86	3.10	1.69	0.00	6.00
IOR with judicial justice system	86	3.57	2.11	0.00	7.00
Total mental health professionals	80	212.90	182.78	0.00	877.68
Total medical facilities	80	4.96	7.49	0.00	33.60
% of children with clinical CBCL	80	0.33	0.15	0.00	0.74

Table 4.3: Correlation Matrix

	1	2	3	4	5	6	7	8	9	10	11
1 IOR with mental health agencies	1.0000										
2 IOR with school	0.6644***	1.0000									
3 IOR with judicial justice system	0.6496***	0.4730***	1.0000								
4 Total services	0.2720*	0.2768**	0.1901	1.0000							
5 Within a public health entity	0.1573	0.0045	0.0052	0.1437	1.0000						
6 Total expenditure	0.3629*	0.3299*	0.3272*	0.1528	-0.1512	1.0000					
7 \$ per children	0.0116	0.1041	0.1145	-0.1771	-0.3507*	0.1867	1.0000				
8 Total caseworkers	-0.0012	0.3004	-0.1925	-0.0374	0.1062	0.1336	0.0311	1.0000			
9 Total mental health professionals	-0.1883	-0.1735	-0.2472*	-0.0734	-0.1176	-0.4827**	-0.2107	-0.0666	1.0000		
10 Total medical facilities	0.0393	-0.1190	0.0601	0.0457	0.1686	-0.0239	0.0167	-0.0316	-0.2702*	1.0000	
11 % of children with clinical CBCL	-0.0291	0.1928	0.0143	0.1380	0.2777*	0.1178	0.1350	0.1402	-0.1427	-0.0038	1.0000

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Poisson regression analysis

The poisson model found that neither total services, embeddedness, financial status, nor organizational size was significantly related to the intensity of IORs with mental health providers ($p > 0.05$) (Table 4.4). Therefore, Hypotheses 1 through 4 were not supported by this analysis.

Only the number of ties with other types of organizations was significantly associated with intensity of IORs with mental health providers in the multiple regression analysis. For example, if an agency director reported one additional type of tie with schools (e.g., joint planning), the rate ratio for the number of ties with mental health providers would be expected to increase by 15% (Incidence Ratio Rate (IRR) = $e^{0.15} = 1.15$, $p < 0.05$). If the number of ties with juridical justice system was increased by one unit, the rate ratio for the number of ties with mental health providers would be expected to increase by 12% (IRR = $e^{0.11} = 1.12$, $p < 0.01$). Thus, Hypothesis 5 was supported by these results.

Table 4.4: Poisson regression model of child welfare agency characteristics on intensity of coordination connections between child welfare and mental health providers (Based on multiple imputation)

	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
H1: Total services	0.01	0.04	0.36	0.716	-0.06	0.08
H2: Total caseworkers*	-0.01	0.05	-0.10	0.920	-0.11	0.10
H3: Within a public health entity	0.28	0.20	1.37	0.172	-0.12	0.67
H4: Total expenditure	0.15	0.24	0.62	0.538	-0.33	0.63
H4: \$ per children*	0.02	0.08	0.25	0.803	-0.14	0.19
H5: IOR with school	0.14	0.06	2.52	0.012	0.03	0.25
H5: IOR with judicial justice system	0.11	0.04	2.69	0.007	0.03	0.19
Total mental health professionals*	-0.02	0.08	-0.22	0.823	-0.17	0.13
Total medical facilities*	0.00	0.09	0.03	0.977	-0.17	0.18
% of children with clinical CBCL	-0.58	0.62	-0.94	0.348	-1.78	0.63
Constant	-0.22	0.90	-0.25	0.803	-1.99	1.54

*Logarithms form

Discussion

Our study is the first empirical research in child welfare to investigate organizational factors affecting interagency relationships with mental health service providers. We found that more intense IORs between child welfare agencies and other systems (i.e., education system and judicial justice system) were associated with more intense coordination between child welfare agencies and mental health providers. Other organizational factors (i.e., service scope, financial stress, size, and affiliation) and contextual factors were not associated with the intensity of these ties.

Intensity of IORs

Seven interagency linkages were examined in this study: discussion and information sharing, joint budgeting or resource allocation, cross-training of staff, working with the agency on child welfare cases, development of interagency agreement and memoranda of understanding, joint planning/policy formulation for service delivery, and other approaches. Exchange of information contributes to coordination, control, planning, and client assessment (Rivard, Johnsen, Morrissey, & Starrett, 1999). Child welfare agencies may negotiate with mental health providers on the agreements, which outline information exchange and cross agency client referral conditions and procedures (Morrissey, Johnsen, & Calloway, 1997). Such agreements stimulate growth in communication and increase client referral and sharing. Quality assurance is enhanced by joint planning/policy formulation for service delivery. Cross-training of staff is potentially one of the most powerful catalysts for collaboration. It not only enriches staff knowledge and skills but also influences values, perceptions, role definitions, and conflict

resolution. IORs can occur anywhere among organizations, and high intensity of IORs indicates more channels to interact with other organizations.

Importance of IORs between child welfare system and mental health providers

There are three reasons why coordination between child welfare and mental health care is vital (Beth, 1996). First, the two systems have programmatic and legislative responsibility for the same population, and their practice would benefit from coordinating their responsibilities. It would be duplicative if each sector maintained its own comprehensive service system. Second, children in each system often need the services from the other system due to the complexity of the problems they face. For example, maltreated children are at a high risk for mental health disorders because of traumas they have experienced. The third reason is the increasingly explicit expectation of accountability, efficiency, and effectiveness by funding sources and other system stakeholders.

Policy implications

Since children in child welfare system have multiple needs, child welfare agencies cooperate with multiple social service systems, such as mental health, education, and the juvenile justice system (Greenbaum et al., 1996; Howell et al., 2004). This study found that more intense IORs with the judicial system and schools were also positively associated with connections between child welfare agencies and mental health providers. This finding indicates that some child welfare agencies were more inclined toward IORs

than others. Our results paralleled a previous study, which found that experienced agency were more likely to participate the interagency activities (Guihan et al., 1995).

One implication of this study is that agencies with more IOR experience might be cultivated as models or leaders who can show other agencies how to form and manage inter-agency ties. These agencies may better understand the value of IORs. Value expectancy creates the feeling that cooperation is a “good thing to do” and consequently may contribute to pulling other organizations in the direction of interorganizational activities. These agencies may also know more about how to navigate the inherent challenges because they can borrow the experiences from prior interagency activities.

Limitations and future study

As with any cross-sectional data, inferences about causation are always open to question. Further longitudinal data are needed to explore how the IORs evolve over time with changes in organizational characteristics. A second limitation is lack of availability of agency weights for inclusion in the analyses, which to some extent limits the generalizability of the findings at the national level. The NSCAW chose the child welfare agencies by a probability-proportionate-to-size procedure that gave a higher chance of selection to PSUs having larger caseloads (Dowd et al., 2004). Unfortunately, however, agency weights are not yet available in the NSCAW data.

Further research needs to analyze the effectiveness of interorganizational linkages for child welfare agencies, and address relevant questions including: At an organizational level, do IORs help organizations resolute conflicts and achieve system agreement? Are IORs helpful to acquire needed resource? At the client level, do IORs improve the

accessibility, continuity, and efficiency of the service? Do IORs contribute to improvement of children's well-being?

CHAPTER FIVE

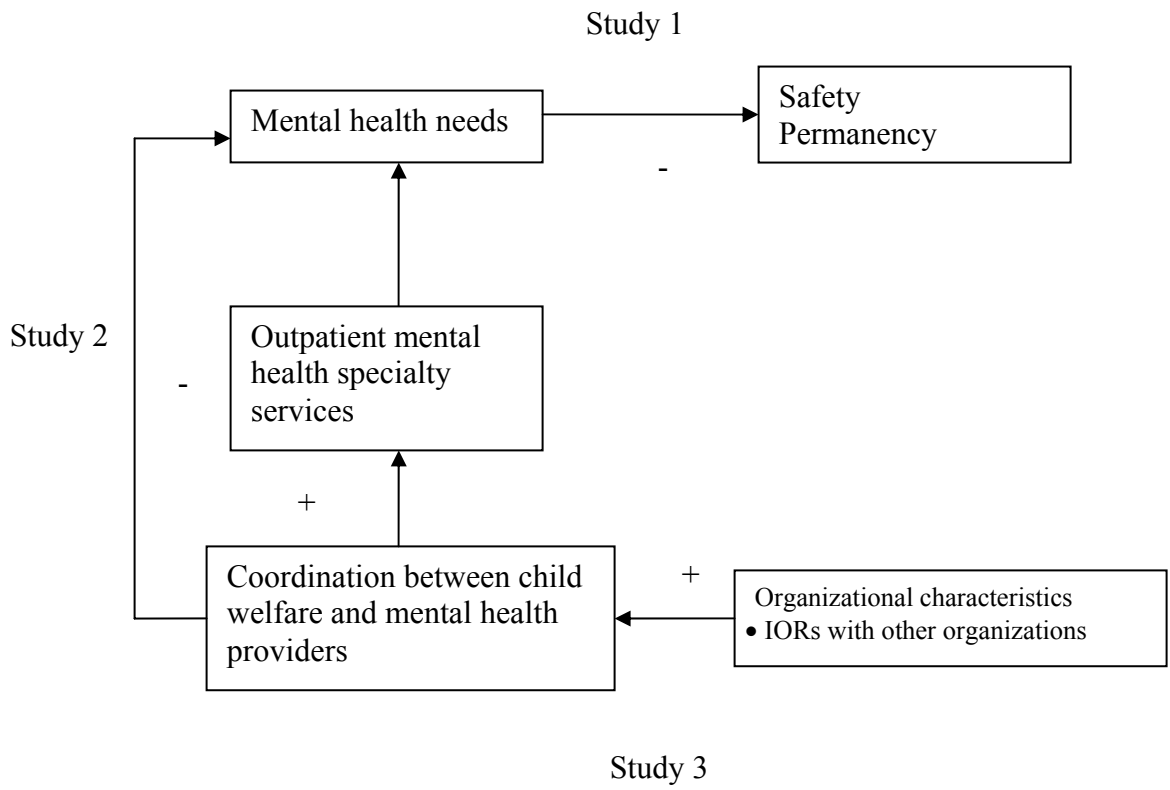
CONCLUSION

Summary of three studies

Focusing on child welfare children with mental health needs, this dissertation evaluates the effects of initial mental health status on future safety and permanency, examines the role of IORs in increasing mental health specialty service use and improving psychological functioning, and explores organizational attributes affecting intensity of IORs (Figure 5.1).

In the first study, I find that having mental health needs increased the risk of having a new maltreatment report and decreased the likelihood of reaching permanency; however, different behavior patterns (i.e., internalizing versus externalizing problems) have different effects. In the second study, results show that more IORs between child welfare agencies and mental health providers both increased the likelihood of mental health services use and improved psychological functioning; and agency-level effects on individual outcomes were not ignorable. In the third study, greater numbers of IORs with other key partners significantly predicted high intensity connections between child welfare agencies and mental health providers as well.

Figure 5.1 Dissertation Results



Contributions

My safety and permanency study is the first to evaluate the relationship between initial mental health status and future safety and permanency in a national sample. Also, this is the first study to explore the unique role of child mental health status in predicting the reoccurrence of childhood maltreatment in both the short term (i.e., 6 months) and long term (i.e., 36 months). In addition, this study builds on previous studies to evaluate the separate effects of externalizing behaviors and internalizing behaviors on safety and permanency rather than only total behavior problems.

The contributions of the second study include the expansion of IORs' measurement from case management-related to both case and administrative level ties, the first study to use nationally representative data to investigate the effects of IORs between child welfare agencies and mental health providers on service use and psychological functioning for children over time, the first one to evaluate the magnitude of agency-level effects on psychological changing among child welfare children, and one of a few studies to use multilevel modeling method to explore hierarchical effect on individual outcomes.

The third study is the first empirical research in child welfare to investigate organizational factors affecting interagency relationships with mental health service providers. It is also one of a few studies highlighting the impacts of a certain agency's IORs with one organization on this agency's IORs with other organizations.

In general, this dissertation extends previous research through the use of a nationally representative sample, a rich array of measures from multiple sources,

appropriately sophisticated quantitative methodologies, and a systematic approach to very complex issue.

Policy implication

1. Provide mental health assessment right after children enter the child welfare system

Since our study shows that initial mental health problems have a negative effect on future safety and permanency, the caseworker should conduct a screening of mental health status as early as possible after children enter the child welfare system. However, nearly 10 percent of state and county child welfare agencies did not conduct the initial health assessment within 30 days, the standard established by the Child Welfare League Association (CWLA) (Inkelas & Halfon, 2002). Even among those conducting health assessments, more than 40 percent of state and county child welfare agencies did not screen for mental health problems. Failure to provide health assessment right after entrance into the child welfare system may delay timely referral to mental health professionals and appropriate treatments.

2. Conduct timely interventions on their mental health problems, especially when children are placed in foster care

If child is identified to have mental health needs, appropriate interventions should be timely conducted. Interventions include referring the child to mental health specialty service, considering mental health needs as a risk factor in permanency planning, and establishing a comprehensive plan which should invite family, mental health providers, and child welfare caseworkers.

3. Strengthen the coordination between child welfare and mental health systems through all levels

Our study shows that more IORs between child welfare and mental health agencies increased the likelihood of mental health services uses and improved mental health status, and agency-level effect on both outcomes were not ignorable. Based on these findings, policymakers should develop policies and initiatives to strengthen the coordination between child welfare and mental health systems. Coordination should be not limited to those at the case level. Rather, multiple ties across hierarchical levels should be developed among agencies. Elements that can be coordinated include information, resources, clients, and programs (Klonglan et al., 1976). Thus, the strategies for the interagency activities between child welfare and mental health agencies include exchange of children' maltreatment, medical reports, and other relevant information, resource exchanges of funds and materials (i.e., joint budgeting and resource allocation), cross-training of staff, working with agency on individual case, written agreements to share activities between organizations, and joint programs to plan and implement service delivery.

4. Role of organizations with IOR experiences

We found that greater number of IORs with the judicial system and school was positively associated with a greater number of connections between child welfare agencies and mental health providers. This finding indicates that some child welfare agencies were more inclined toward IORs than others. This finding has an important

policy implication on human service integration. Agencies with more IOR experience might be cultivated as leaders who show other agencies how to form and manage inter-agency ties. These agencies may understand the value of IORs and benefit from coordination with others. These agencies may become more comfortable and competent because prior experience would contribute to their selection of an intervention that avoids conflicts among network members. Thus, they probably active in all domains of IORs through engagement with one or more sectors. Future study is needed to examine this hypothesis by using longitudinal data rather than cross-sectional data.

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EDUCATION

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SELECTED PUBLICATIONS

Bai Y., Hillemeier M.M., and Lengerich, E.J. (2007). Race/ethnic disparities in symptom severity among children hospitalized with asthma. *Journal of Health Care for the Poor and Underserved*. 18(1): 54-61.

Hillemeier M.M., Gusic M., and **Bai Y.** (2006). Communication with school nurses about asthma and perceived obstacles to care. *Ambulatory Pediatrics*. 6(4): 198-203.

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Bai Y. (2002). Arterial compliance change and its screening among patients with diabetic. *Prevention and Treatment of Cardio-Cerebral Vascular Disease*. 2(1): 41-42.

Bai Y. and Zhang W.Z. (2002). Primary studies on indexes of arterial compliance. *Prevention and Treatment of Cardio-Cerebral Vascular Disease*. 2(2): 8-10.

SELECTED PRESENTATIONS

Bai Y., Wells R., and Hillemeier M.M. Do mental health needs affect safety or permanence for children? National Conference on Child Abuse and Neglect. Portland, Oregon. April 2007. Presenter.

Bai Y. Effects of insurance status on length of stay among hospitalized children with asthma in Pennsylvania, 2001. American Public Health Association Annual Meeting, Washington, DC, November 2004. Presenter.