Re-reporting of child maltreatment: Does participation in other public sector services moderate the likelihood of a second, maltreatment report?

Brett Drake, **Melissa Jonson-Reid**, and **Lina Sapokaite**
George Warren Brown School of Social Work, Washington University in St. Louis, Campus Box 1196, One Brookings Drive, St. Louis MO, 63130, USA

Abstract

Objective—This study uses administrative data to track the first re-reports of maltreatment in a low-income, urban child welfare population (n = 4,957) while controlling for other public service involvement. Service system involvement is explored across the following sectors: Child Welfare, Income Maintenance, Special Education, Juvenile Court, and various forms of Medicaid-reimbursed medical or mental health care. This study builds knowledge by adding the services dimension to an ecological framework for analyses and by following recurrence for a longer period of time than prior investigations (7.5 years).

Method—We model the re-reporting of a child for maltreatment as a function of child, caregiver, service, and neighborhood characteristics using data from birth records, child welfare, income maintenance, Medicaid, adult corrections, juvenile court, special education, law enforcement, and census sources. Bivariate and multivariate analyses are presented, the latter using Cox regression with a robust sandwich covariance matrix estimate to account for the intra-cluster dependence within tracts.

Results—Key results across bivariate and multivariate analyses included a lower rate of re-reporting among children with parents who were high school graduates and/or permanently exited from the first spell on AFDC (p <.0001); and for children in families that received less intensive in-home services compared to those not receiving services, receiving intensive in-home, or foster care services (p <.0001). Higher rates of re-reporting were found for children with Medicaid mental health/substance abuse treatment records (p <.0001) and special education eligibility for emotional disturbance (p <.005).

Conclusions—Caretaker characteristics and non-child welfare service use patterns had a strong association with the likelihood of a child being re-reported to the child welfare agency and should be more heavily attended to by child welfare workers. High rates of service sector overlap suggest that inter-agency ties and cooperation should be strengthened. The lower risk associated with less intensive in-home services compared to un-served cases may indicate under-identification of in-home service eligibility following a first report of maltreatment.

Keywords

Child welfare; Child abuse and neglect re-reporting; Services; Ecological model

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Correspondence to: Brett Drake.

Introduction

Predicting recurrence among child maltreatment reports has been a longstanding goal (Depanfilis & Zuravin, 1999; Drake, Jonson-Reid, Way, & Chung, 2002; English, Marshall, Brummel, & Orme, 1999). The association of ongoing maltreatment with a range of negative outcomes for children (Jonson-Reid & Barth, 2000; Manly, Cicchetti, & Barnett, 1994) highlights the importance of this area of research. If agencies can better understand the individual, family, service, and community characteristics that are associated with recurrence, this will improve their ability to target services for first-time child welfare clients. In addition to these practical benefits, a more detailed understanding of predictors of recurrence supports theory building in the area of the etiology and course of chronic child maltreatment. This article examines ecological predictors, including individual, family, service and community variables of the first recurrence of child maltreatment over a long period of time.

Theory suggests that child outcomes like recurrent maltreatment are influenced by factors at multiple levels (Belsky & Vondra, 1989; Bronfenbrenner, 1979; Cicchetti & Toth, 1995). Some studies have controlled for child and family risk factors such as a child's special needs or caregiver's mental health disorder (e.g., DePanfilis & Zuravin, 1999; English et al., 1999; Hamilton, C. & Browne, 1999). Few studies have tried to control for participation in different sectors of public services (called "cross-sector services" in this article). By sectors, we mean broad areas of public services, such as child welfare, medical services, special education or delinquency (DePanfilis & Zuravin, 1999; Drake et al., 2002). Further, the sole focus on substantiated cases in many studies limits our understanding of the recurrence of child abuse reporting within the larger child welfare population (Drake et al., 2002; English et al., 1999; Lipien & Forthofer, 2004).

This study employs an ecological framework (Bronfenbrenner, 1979) to understand recurrence as a function of (1) multi-level indicators of risk present at the time of the index (initial) report and (2) cross-sector service participation immediately following the report. The term "Cross-sector" is commonly used to refer to services from multiple service domains (e.g., Child Welfare and Juvenile Justice). Subjects in the current sample were followed from their first known child protective services (CPS) contact for 7½ years. Administrative data in the form of birth records, child welfare, income maintenance, Medicaid, adult corrections, juvenile court, special education, law enforcement records (community crime) and census data are used to model recurrence.

Background

In the United States, after a report of child abuse or neglect is made, that case is either assigned a child welfare worker for investigation or closed due to lack of information, false report, and so forth. Once investigated, a report may or may not be substantiated (see Drake, 1996 for discussion of substantiation). In some states, substantiation is a necessary pre-condition for services (Drake & Jonson-Reid, 2000); in others, child welfare services may be provided to unsubstantiated cases. The primary aim of child welfare intervention is to protect the child by preventing further maltreatment. Cases that return to the attention of child welfare are of major concern because they often represent a failure to protect the children, are costly, and can be associated with negative long-term developmental outcomes for the children (Drake et al., 2002). Rates of recurrent reporting have varied in the literature according to the length of the follow-up period, definitions of recurrence, and characteristics of the sample (DePanfilis & Zuravin, 1998). Studies which followed recurrence for between two and four years show recurrence rates of between 30% and 60% (DePanfilis, 1995; Drake et al., 2002; English et al., 2002; Fryer & Miyoshi, 1996). A number of factors have been found to be associated with recurrence.

Child demographics

Prior studies have shown that recurrence is most common soon after the initial event (Depanfilis, 1995; Lipien & Forthofer, 2004; Marshall & English, 1999), and among younger children (Berrick, Needell, Barth, & Jonson-Reid, 1998; Drake et al., 2002; Fryer & Myoshi, 1994; Fluke, Yuan, Edwards, 1999). Some studies found small differences in recurrence by race (Lipien & Forthofer, 2004). Other studies which controlled for factors, like poverty, have failed to identify race as a predictor (Fluke, Yuan, & Edwards, 1999; Levine, Doueck, Freeman, & Compaan, 1996).

Poverty

Poverty at the individual and community level has been found to predict recurrence for all types of maltreatment (Drake et al., 2002; Kruttschnitt, McLeod, & Dornfeld, 1994; Nelson, Saunders, & Landsman, 1993). This finding is consistent with the large body of literature demonstrating a link between low SES and child maltreatment in general (see Drake & Zuravin, 1998 for review). It is not known, however, how recurrence patterns may vary within a poor population.

Family and child risk factors

Family level risk factors associated with recurrence include caregiver involvement with drugs or having mental health disorders (English et al., 1999; Fuller, Wells, & Cotton, 2001; Gaudin, 1993), past history of maltreatment for the parent, particularly if the maltreatment was severe or chronic (English et al., 1999; Kaufman & Zigler, 1987; Oliver, 1993; Zuravin, McMillen, DePanfilis, & Risley-Curtiss, 1996), and other family stressors like domestic violence, teen parenthood, or social isolation (Cash, 2001; Zuravin & DiBlasio, 1992). While some research suggests that children with special needs (e.g., cognitive, medical or mental health conditions) have higher risk of maltreatment (Burrell, Thompson, & Sexton, 1994; Sullivan & Knutson, 2000; Zuravin, Orme, & Hegar, 1994), it is not known if these special needs are also associated with recurrent maltreatment.

Characteristics of index report

Neglect cases recur more frequently than other types of maltreatment (Drake et al., 2002; Fryer & Miyoshi, 1996). In contrast, substantiation status of the index event has generally been found to have a nonsignificant (English, Marshall, Coghlan, Brummel, & Orme, 2002) or modest (Drake et al., 2002) impact on recurrence. This is consistent with the Harm/ Evidence model of substantiation that asserts that substantiation is not equivalent to verifying the presence of maltreatment but rather a label used when sufficient evidence and/ or risk of harm exists to permit family court intervention if needed (Drake, 1996). Further, several studies have found that many unsubstantiated cases include harm or risk of harm to the child (Drake et al., 2002 English et al., 2002; Jonson-Reid, Drake, Kim, Porterfield & Han, 2004; Leiter, Myers, & Zingraff, 1994).

Child welfare and public sector services

In most states there are two forms of in-home child welfare services, a less intensive family support approach and more intensive family preservation programming. A relatively small proportion of children are removed from the home after an initial report of maltreatment and placed into foster care. Because the goal of child welfare intervention is to prevent further maltreatment, it is important to control for child welfare services in studies of recurrence to help to identify possible targets for change. While provision of the in-home family support services has been found to be associated with a reduction in recurrence in some studies (Drake et al., 2002; DePanfilis & Zuravin, 1998, 2002; Johnson & Clancy, 1988), other work has found a moderate increase associated with these services (Lipien & Forthofer,

2004). In general, studies of the more intensive family preservation services have found moderate to high levels of recurrence (Heneghan, Horwitz, & Leventhal, 1996; Staudt, Howard, & Drake, 2002; Westat, Chapin Hall Center for Children, and James Bell Associates, 2001). With regard to recurrence following foster care, English and colleagues (1999) found high rates of recurrence within this population. Another study found that recurrence among prior foster children varied according to whether the initial report was substantiated (Drake et al., 2002). A third study found that the likelihood of re-reporting varied by the amount of time spent in foster care (Jonson-Reid, 2003). There is no currently available published work that investigates recurrence while controlling for both child welfare services and other cross-sector service (e.g., mental health, special education, income maintenance) participation.

The limitations of the above studies lead to a range of remaining questions. First, children in studies of recurrence are often followed for a relatively short time, usually 3 years or less. This may result in an underestimation of recurrence rates. Second, most recurrence studies do not consider risk factors from multiple domains (e.g., caregiver mental health, child special needs, community conditions). Third, many studies are restricted to substantiated cases only. Finally, despite widespread agreement on the importance of an ecological orientation, child and family involvement in public services outside the child welfare sector (e.g., special education) have been largely omitted from models. Participation in services to address other needs like disabling conditions or lack of income may impact the continued level of risk present (Jonson-Reid, 2004). Our study attempts to begin to bridge this gap in knowledge by simultaneously considering multilevel (incident, child, parent, family, community) risk factors, as well as services from child welfare and other public sector agencies. We evaluate the association of these factors with recurrence among low-income families over 7.5 years.

Our research question is: What multilevel risks, child welfare services and other services are associated with a higher risk of re-reporting over time? Directional hypotheses based on the literature include: (1) Children initially reported for neglect will have higher rates of recurrence (Drake et al., 2002); (2) Caregiver risk factors present at the index report will predict recurrence (DePanfilis & Zuravin, 1999; English et al., 1999); (3) Crime, residential instability and low income in the subject's census tract will predict recurrence; (4) Children whose families received in-home child welfare services will have lower rates of recurrence (DePanfilis & Zuravin, 1998, 2002; Drake et al., 2002). (5) Special Education sector services will predict recurrence. No prior studies of recurrence and special education exist but some studies have found children with disabilities are more vulnerable to maltreatment (Sullivan & Knutson, 2000). (6) We anticipate there may be a small difference in recurrence rate by substantiation status (Drake et al., 2002; English et al., 1999, 2002). The relative association of other service sector participation with recurrence is unknown and will be explored.

Methods

This article used data from a larger study that includes both maltreated and non-maltreated low-income children from a large Midwestern metropolitan area. Nearly 75% of the children were persons of color. The median 1990 family income in census tracts where study children resided was $22,000.

Sample

The sampling frame for the parent study was limited to children from families receiving Aid to Families with Dependent Children (AFDC) between the years of 1991 and 1994 to provide important information regarding this particularly vulnerable population. AFDC was

a public assistance program supporting needy families with children, later replaced by Temporary Assistance to Needy Families (TANF) from 1996 on. The parent study includes both children with a first report of child abuse and neglect (CAN) in 1993 or 1994 ($n = 5,127$) and a matched comparison sample without CAN reports or other child welfare involvement through 1994 ($n = 5,127$). All subjects were born from 1982 through 1994.

The sub-sample used for the present analysis includes only those children with a CAN report in 1993 or 1994. "First known contact" means that neither the child nor any known family member (including any child residing in the home according to AFDC records) had a known prior report or child welfare service event. Unfortunately, due to the nature of the available data, some children may have had unsubstantiated reports prior to 1993 for which we had no record. Children dying within 5 days of the index event (for non-maltreatment reasons) were excluded from the sample. Because we were interested in modeling the impact of variables largely present in the family of origin and child welfare interventions designed to decrease future maltreatment within the family of origin, we excluded children who entered foster care immediately following the index report and never exited. All children were followed for 7.5 years (90 months) following the initial report. The final N for this study was 4,957 children.

Data sources

We used the following datasets: statewide **adult corrections entries**; statewide **birth records**; 1990 **US census tract** information; statewide **child welfare** data (i.e., CAN reports (including specific subtypes of maltreatment, substantiation status and relationship to perpetrator), Family Centered Services (FCS), Family Preservation Services (FPS) and Foster Care); statewide **death records;** statewide **income maintenance** data (AFDC and TANF); statewide **juvenile corrections**; statewide **Medicaid** data including, health hospitalization and inpatient and outpatient mental health treatment; metropolitan region **juvenile court** records; metropolitan region **law enforcement** community crime records; and metropolitan region **special education** eligibility records.

Data preparation

All records were taken from electronic administrative data records maintained by the agencies in the normal course of services. Some of the datasets used in the present study shared a common state-level case identifier across agencies (i.e., child welfare, income maintenance, juvenile corrections and Medicaid). The other datasets were matched according to identifying information, including the first four letters of first and last name, as well as date of birth. Match rates were hand checked and other identifying information was used in ambiguous cases (e.g., gender, middle initial). Addresses at the time of entry into the sample event were geocoded using Arcview and linked to census and community crime information. Although dates allow prospective analysis, all events and services in the study occurred prior to the receipt of the data. All identifiers were removed following linkage and are not present in the analysis data. Results are always reported at an aggregate level sufficient to prevent identification of individuals. Human subjects approval was obtained from the Washington University (Hilltop) Human Subjects Committee, as well as from agencies providing data.

Variables

The dependent variable for the present study was a second report of maltreatment more than 14 days after the first (index) report or following an exit from foster care, and prior to (1) the end date, (2) the date at which a child turned 18, or (3) the date at which a child died. The exclusion of reports within 14 days was done to attempt to exclude reports that were being

made on the same incident. If a child entered foster care or was incarcerated, the time away from the family of origin was censored out of the risk period.

Independent and control variables include child, family, neighborhood and service variables. The variable descriptions and source of variables are given in Table 1 (see Table 1). Explanations of recoded variables are given here. Race was dichotomized into White and "Of Color," which is over 96% Black. Birth and Medicaid ICD-9 and ICD10 classifications were recoded into broad categories for analyses, including mental health and substance abuse, medical risk in infancy, and hospital care for chronic health conditions (asthma, cerebral palsy, juvenile diabetes, etc.). To create the "medical risk in infancy" variable, diagnoses for hospital care at birth through 12 months were reviewed with a neonatologist to identify those conditions likely to result in ongoing special needs. Maltreatment types were recoded from 45 specific subtypes listed (e.g., "skull fracture" was coded as "physical abuse" while "lack of supervision" was coded as "neglect" and children with subtypes from different types were coded as "mixed"). Child welfare service variables following the index event were established categorically as follows: no services recommended or given; worker recommended services but no services started; lower level in-home services (called FCS in the study region); intensive in-home services (called FPS in the study region), or foster care placement. FCS or FPS services had to be initiated within 45 days of the index event and before a recurrence event to be counted as triggered by the index event. Foster care services had to be initiated within 90 days of the index event and before a recurrence event. Family centered services include lower intensity case management, counseling and referral (median service duration: five months). Family preservation services are high intensity, very short-term services provided to prevent higher risk cases from resulting in placement in care (median service duration: 1 month). FCS services are commonly provided alone, but FPS services are almost always provided with FCS services.

Service system contact outside the child welfare system (what we call cross-sector services) included income maintenance, child and caregiver Medicaid services for mental health/ substance abuse, child hospital care for a chronic health condition, child eligibility for special education, and child contact with juvenile court for status offense or delinquency. Income maintenance use patterns were identified as ongoing or a permanent exit that was not due to known negative causes (i.e., caretaker incarceration, etc.). A permanent AFDC exit was defined as (1) no re-entry into AFDC or TANF within the study period, (2) the absence of a negative exit code from AFDC, (3) absence of record of all children dying or going into foster care, and (4) absence of record of caretaker incarceration. Service variables were broken out by whether or not the occurrence or exit from AFDC occurred prior to the initial maltreatment event or within a reasonable timeframe after the first report. Indicators of service contact (or AFDC exit) following the first report were limited to occurring (1) prior to a second report (if applicable), and (2) within the first year after the maltreatment report.

Community census tract variables selected included median household income, mobility (proportion moved within last 5 years), and calls to police for violent crime per 1,000 residents. These community indicators were chosen because of their theoretical correspondence to social cohesion (Garbarino & Kostelny, 1992; McCloskey & Bailey, 2000). The police calls variable was not available for all areas due to a small number of police jurisdictions that did not archive these data. To address this issue the variable was recoded as missing, low, medium or high rates based on the univariate distribution of the variable.

Analysis

All analyses were done in SAS Version 9.1. Descriptive analyses included chi-square and survival analyses. Bivariate associations between the study variables and recurrence events over time were assessed using lifetable and survival curve analyses. In simple terms, survival analysis is a means of examining the proportion of cases that have or do not have an event over time, while controlling for the exit of subjects from the at-risk study population for other reasons. For example, if a study continues for 7 years, but a child moves out of the area permanently at the end of year 4, that child's "risk" of the outcome cannot be measured during the last 3 years. Survival analyses techniques "censor" or exclude this child from the denominator of "at risk" children during the last 3 years. Survival analyses also provide assessments of the significance of the association of values of a given variable with this event. The Log-Rank statistic is reported as the bivariate test of significance because it is more commonly used and because, in our analyses, the Wilcoxon and the Log-Rank statistics always agreed with regard to statistical significance thresholds.

For multivariate analyses, Cox regression models were constructed using the robust standard error estimates based on the sandwich estimator option to control for intercorrelations by geographic unit (Allison, 1996; Lee, Wei, & Amato, D, 1992). This was done for two datasets: (1) the full dataset (N = 4,957); and (2) a sample restricted to children ages four or older (n = 2,520) to control for children's service sector participation as these services were primarily relevant to school-aged children. Graphic plots from the bivariate analyses of the negative log (estimated survivor function) against the log (failure time) were used to assess violations of proportionality for all main effects and interaction terms. An interaction term between a non-proportional variable and time was created if needed to adjust for non-proportionality in the multivariate model (Allison, 1996). These terms are created based upon the particular relationship a variable has with time. For example, a variable may not have a differing association over time until 1 year has passed, so an interaction term is created between the variable of interest and that particular time period. Time interactions were entered into the multivariate model. Terms which were not significant, did not modify the significance of other independent variables or the overall model fit were dropped from the final model. Variables were entered in clusters and the model chi-square reported after each cluster is entered. Clusters included, child characteristics, maltreatment report characteristics, family characteristics, caretaker service use, child welfare services, other children's services (only for sample of children age 4 and older) and census tract variables. Child demographic variables were always retained; other variables that did not achieve significance were dropped from the final model for the full sample. Although maltreatment type was not significant in the model restricted to older children, it was retained for purpose of comparison. Interactions between services and time were included based on prior work (Drake et al., 2002). The Wald Chi-square is reported for the model fit as this is consistent with the adjusted error terms provided by the sandwich estimator. In simple terms, significant hazard ratios larger than 1 indicate increased risk (e.g., 1.9 represents 90% more risk than the reference group), and those less than 1 indicate decreased risk of the outcome (e.g., 0.5 represents 50% the risk of the reference group). The simplest interpretation of a hazard ratio for a continuous variable is a % change per unit of the variable. A significant hazard ratio of 1.05 for age, for example, would indicate a 5% increase in risk per year of age.

Results

The recurrence rate for our sample was 47.7% at the end of 3 years and 62.1% at 7.5 years. Because of the inclusion criteria for the study, all children in the sample were participants in at least two systems at the start of the study period (child welfare and AFDC). Additionally, at the time of the first report of child abuse or neglect, 12.4% of the cases had already had a

contact with either adult or child Medicaid mental health services, child health services for a chronic condition, special education, or juvenile court. These 12.4% of the cases had higher rates of later re-reports (69.7% v. 61.1%, $p = .0001$).

Bivariate analyses (full sample)

Rates of recurrence at 3 and 7.5 years and the Log Rank X^2 statistics can be found in Table 2. Among child level characteristics, only the child's age was significant, with younger children having higher recurrence rates (67.2% of infants [12 months or younger] compared to 60.2% of children aged 10 or 11, $p < .0001$). Among family level characteristics, the presence of more children in the household was significantly associated with recurrence (57.7% for 1 or 2 children, 65% for 3–5 children and 76.8% for households with 6 or more children, $p < .0001$). Whether a caregiver graduated from high school was associated with a lower risk of recurrence (50.4% vs. 68.1%, $p < .0001$). A caregiver's history of being a foster child was associated with a higher recurrence rate (68.5% vs. 62.4%, $p = .025$), as was being under the age of 19 at the birth of the first child (65.1% vs. 61.4%, $p = .043$). Children reported for either neglect or mixed types of maltreatment (65.4% and 66.5%) had higher recurrence rates than children initially reported for physical (57.5%) or sexual abuse only (52.3%, $p < .0001$). There was no significant association between substantiation of the initial report and recurrence. If there was more than one child officially listed as a victim on the case, the recurrence rate was higher (68.5% vs. 59.0%, $p < .0001$).

The association of caregiver service participation was broken out according to whether the services began before or after the initial maltreatment report (see Methods section). For cases with a recurrent report, service use after the index report was only considered if it occurred prior to the second report. Caregivers with mental health or substance abuse Medicaid treatment had higher rates of recurrence (79.2% [prior to index] vs.64.8% [after index] vs. 61.8% [no record of treatment], $p < .0001$). Caretaker exit from AFDC after a first spell within a year of the index event with no further re-entry or negative reason for exit was associated with a lower recurrence rate (46.2% [prior to index] and 35.3% [after index]) than children whose caretakers continued on AFDC, re-entered AFDC or experienced a negative known exit (64.9%, $p < .0001$). For purposes of this paper, we define a "spell" as one interrupted time period using a given service, in this case, AFDC. For example, an individual entering AFDC for the first time, exiting and then re-entering AFDC would have had two spells. Families who were referred to and accessed Family Centered Services (FCS) following the report of maltreatment had lower rates of recurrence (50%) than all other child welfare service levels (72.0% and 64.5%) and those cases who were not assessed as needing services (63.3%) or were assessed as needing services but never began services (76.7%, $p < .0001$).

Among community variables, higher levels of median household income were associated with lower rates of recurrence for levels above \$20,000 per year ($p < .001$). Higher mobility was associated with higher recurrence (64% v. 61.3 p %, < .05).

Bivariate analyses (restricted sample of children aged 4 through 11 years at index report)

The same process was repeated for the sample restricted to older children in order to assess a variety of children's services that were too uncommon to examine among younger children (e.g., mental health services, special education, etc.) (see Table 3). Again, service use was broken out by whether it was initiated prior to or following the maltreatment report (index) with one exception. Because Medicaid hospital care for a chronic health condition was so rare prior to the initial maltreatment report, this variable had to be collapsed into a single (yes=1) value that included prior and post-index participation. Because violent crime and mobility in census tract, caregiver age at birth of the oldest child, and caregiver history of

foster care were not significant in bivariate analyses, they are not shown in the table to conserve space.

The child's age was not significant in the restricted sample. Female children had a lower rate of recurrence (58.7% v. 62%, p =.04). Record of either caregiver or child's Medicaid mental health or substance abuse treatment was positively associated with recurrence. Also, a child's Special Education eligibility for emotional disturbance was significant and positively associated with recurrence.

Multivariate model of recurrence (full model)

A Cox regression model was constructed for the full model, using the robust standard error estimates based on the sandwich estimator. The model was re-run for every additional cluster of variables entered from the child level, to the caregiver level, to the service level, to the community level with the Wald (sandwich) X^2 reported for each cluster. Hazard Ratios are reported for the independent variables (Table 4). At each stage, the change in the model X^2 was significant. Outside of retaining all child demographic variables, only those variables with significant coefficients or significant model effects were retained. Only the results from the final model or variables that changed across models are discussed in the text.

Child, index report, and family variables

Similar to bivariate results, the likelihood of recurrence declined according to the age of the child (HR =.970 [about 3% decrease in risk per year of age from birth through 11], $p <$. 0001), but this was somewhat offset for children between 12 months and 36 months after the index report (child age and time interaction, HR = 1.026, $p <$.05). Race became significant after entering family characteristics (see Model 3, Table 4), and children of color had about a 17% lower risk of being re-reported (HR =.825, p <.0001). Both physical abuse and sexual abuse cases were less likely to be re-reported than children with initial reports of neglect or mixed type. Substantiation status interacted with service provision (discussed below). Children reported along with other victims at the same time had about 22% higher risk of being re-reported. Having a caregiver that graduated high school reduced the risk of being re-reported (HR =.878, p <.0001), while having more siblings increased the risk (about 16% per recoded category per sibling in the family).

Service variables

Caregiver history of mental health or substance abuse treatment prior to the index report was associated with higher risk of recurrence (HR = 1.576, $p <$.0001), but similar record after the index maltreatment report (or before recurrence) was not significant. A permanent (see Methods section) exit from a first known period on AFDC was associated with a decreased risk of re-reporting (HR =.878, $p <$.005 (if exited prior to index report); HR =.684, $p <$.005 (within 1 year of index or before recurrence)). Children whose cases indicated need for child welfare services but did not begin services had higher rates of recurrence (HR = 1.467, $p <$. 005). The association between recurrence and participation in child welfare services varied by type of service, time after index report (for foster care), and substantiation. Among children whose cases were not judged to require services after the index report, children with substantiated cases had about a 30% higher rate of recurrence (HR = 1.293) than children with unsubstantiated cases. Children in families that received Family Centered Services (FCS) had lower rates of recurrence than those not served or who received more intensive in-home or foster care services (FCS: HR =.715, $p <$.005). Other child welfare service categories had significant interaction with substantiation status. For example, FPS services was associated with a higher risk of a re-report (O.R. = 1.44) that was entirely offset if the case was also substantiated (see Substantiation & FPS interaction HR =.553, $p <$.05). The

relationships between foster care and re-reporting was even more complex. Children who entered (and exited) foster care had over twice the likelihood of a re-report (O.R. 2.49), but this was offset for cases who entered foster care following a substantiated report (O.R. =.48) and fully offset for children entering after a substantiated report for the first 57 months after the initial report (censoring out time in care) (O.R =.50)

Community variables

The only census tract variable that remained significant was median household income. Each increase in $1,000 of income was associated with a half percentage point drop in risk (HR =.995, $p<.005$).

Model of re-reporting with children's service participation (children over the age of 4 only)

The multivariate model for the restricted sample was constructed in the same way as for the full model (see Table 5). Being female was associated with a decreased risk of recurrence until we controlled for child welfare service provision (compare Models 1–4 with 5 and after). Older children initially had higher rates of recurrence but this changed over time, dropping by about 0.002% per month, per year of age over the 90 months. Maltreatment type was not significant in the model restricted to older children. Compared to the full sample model, the receipt of FCS services was associated with lower recurrence, while foster care was associated with a greater risk of recurrence.

Due to sample size, children's cross-sector service participation before and after but within 1 year of the index event was collapsed into an ever used (yes/no) variable. Children with a record of Medicaid mental health or substance abuse treatment had about twice the risk of later recurrence (HR = 2.063, $p<.0001$). Children eligible for Special Education services for Emotional Disturbance had about a 50% higher risk of a re-report (HR = 1.493, $p<.001$). An interaction with time indicated that children eligible for special education for other disabilities (not Emotional Disturbance) had increased risk of a re-report only after about 3 years following the index report. Initially, children with juvenile court petitions had lower risk of recurrence (HR = 0.610, $p<.05$) but their risk increases over time at about 2% per month (HR = 1.020, $p<.05$, court petition * months interaction).

Discussion

Consistent with an ecological framework, child, family, service, and community factors, were found to be associated with the report of maltreatment. Family/Caregiver characteristics and services information had the strongest associations with re-reporting across analyses. Factors associated with a reduced likelihood of a re-report at the caregiver level included having completed high school and a permanent AFDC/TANF use exit either prior to the initial maltreatment report or within one year of that report. In multivariate models, a record of caregiver Medicaid mental health/substance abuse service prior to the index report was associated with an increased risk of a re-report, but there was no association between these services received after the index report. Childhood Medicaid mental health/substance abuse records, and eligibility for special education (particularly for emotional disturbance) were associated with a re-report. The relationship between child welfare services and a re-report varied by substantiation status of the initial report and the type of services. Those children in families receiving FCS services had the lowest likelihood of a re-report. The findings highlight the importance of considering factors at multiple levels and across different service sectors in developing recommendations for practice, policy formulation, and research design.

Recurrence rates

Our study's recurrence rate of over 62% by 7.5 years may appear to be higher than those reported in prior studies, (DePanfilis, 1995; Drake et al., 2002; English et al., 2002; Fryer & Miyoshi, 1994), but this is a function of the restriction to a low-income population and the long follow-up period. Our recurrence rate of 47.0% at the end of 36 months was comparable to prior work (Depanfilis, 1995; Lipien & Forthofer, 2004; Marshall & English, 1999). More work is needed to understand the persistence of risk of recurrence for some children over longer periods of time. Families who return within the first 36 months may differ systematically from those with longer time periods between reports. It is clearly more difficult to understand how a change in child welfare practice alone might impact recurrence in cases that do not return until more than three years after an initial report. It may be that better collaboration and ability to link families to ongoing services in other sectors (education, mental health, etc.) may hold the most promise in addressing such cases. Agencies may also want to consider timing of recurrence when setting policy regarding the storage of records. For example, recent Missouri legislation requires that unsubstantiated cases be purged within 3 years, but our data suggest that up to 20% of the families continue to return after that time. Under the new policy, these families would appear to be first-time cases to the child welfare investigator when in fact they were recurrent cases.

Child and family demographics

Lipien & Forthofer's (2004) findings using Florida administrative data, that "… recurrent reports are more likely for young and White children" (p.947), were replicated. We also found that children with more siblings had a higher risk of recurrence. It may be that the increased burden on caregivers associated with younger and/or more children leads to higher levels of recurring or continuing maltreatment. A caregiver's completion of high school was significantly associated with lower recurrence. More educated caregivers may be more adept at accessing services or achieving compliance with system requirements.

Characteristics of the initial report and substantiation

Consistent with prior research, children initially reported for neglect had higher rates of recurrence in the full sample (Drake et al., 2002; Fryer & Miyoshi, 1996). Although there remained a significant bivariate difference in the sample restricted to older children, maltreatment type at index did not remain significant in the multivariate model. Also consistent with prior work, there was a small to moderate effect of substantiation of the first report depending upon the services received (Drake et al., 2002; English et al., 1999).

Child and caregiver risk and service factors

Prior research suggested a positive association between a child's special needs and risk of maltreatment, but was focused on the onset of maltreatment (Burrell et al., 1994; Sullivan & Knutson, 2000; Zuravin et al., 1994). Our work suggests that this is also true for recurrent maltreatment. In the sample including infants through age 3, there was a small significant increased risk of a re-report for children who manifested a serious medical or developmental condition in the first 12 months of life as recorded in birth or Medicaid hospital records. This did not remain significant in the restricted sample, which may be both a function of sample size and perhaps a greater significance of this factor among infants and toddlers. In the model based on older children, record of Medicaid treatment for mental health or substance abuse and special education eligibility for emotional disturbance were both associated with higher recurrence. Children receiving special education for other disabilities appear to be at greater risk as they get older.

A caregiver's history of foster care as a child (which could be a weak proxy for history of maltreatment of the caregiver) and having the first child as a teenager were significant at the bivariate but not the multivariate level. It may be that the risk associated with prior maltreatment history or early parenthood is explained or masked by measures of caregiver education, mental health, family size, and capacity to permanently exit from AFDC. The previously noted association between a caregiver's mental health or substance abuse disorders and recurrence (English et al., 1999; Fraser, 1997; Fuller et al., 2001; Gaudin, 1993) was confirmed in this study. Children whose caregivers had record of Medicaid treatment for mental health or substance abuse disorder prior to the index report were over 50% more likely to experience recurrence. This was a surprisingly strong finding given the likelihood that the administrative sources used may fail to identify many caregivers with mental health or substance abuse problems. Children with caregivers with a permanent exit from a first spell on AFDC (TANF had not yet been implemented within 1 year of the initial report) had about half the risk of recurrence as children with ongoing AFDC/TANF participation, continued multiple spells on AFDC/TANF, or exits for negative reasons. There are many possible interpretations for this relationship. The reduction in recurrence could be attributed to an underlying higher general capacity among caregivers who exited after this first AFDC spell, or to benefits in caregiver self-efficacy related to the exit, or to improved economic status.

Community factors

In the larger sample without controls for childhood service sector participation, median household income at the census tract level was significantly associated with recurrence. This is consistent with other studies that have found that indicators of neighborhood disruption, such as high rates of mobility, can vary even within samples of the very poor and are related to maltreatment (Garbarino & Kostelny, 1992; McCloskey & Bailey, 2000). As previously noted, limited variability may have restricted our ability to show stronger effects.

Child welfare services

The finding that families receiving the lowest intensity in-home services (FCS) had lower recurrence rates than families receiving no services or more intensive forms of child welfare intervention held even controlling for substantiation status at index and cross-sector service participation. While we cannot assess causality absent a randomized group design, the findings are certainly provocative. If it is reasonable to assume that cases identified by child welfare as not needing services are lower risk cases, then one might anticipate equal levels of or long-term **increases** in recurrence among served cases, since these families have more problematic issues. We found, however, that cases receiving FCS services had substantially **lower** rates (15%–20%) of recurrence over time than those with no identified service need. If such findings are replicated, it is possible that child welfare is under-identifying the need for lower levels of in-home service provision among cases reported for the first time.

Our data tell a complex story for other levels of child welfare intervention (intensive in-home services [FPS] or foster care placement). In general, children whose cases were substantiated at index seemed to fare better following FPS or foster care than those whose cases were unsubstantiated but received those services. It is not known whether the interaction with substantiation and higher levels of child welfare intervention is related to caregiver compliance with services plans or some other factor. The risk associated with foster care entry depended upon both substantiation of the initial report and time at risk. Children who either exited after longer stays in care leaving less time at risk prior to study end or were older at the time of entry were among those with the shorter period at risk. Most research on children exiting foster care has focused on re-entry into care rather than a re-report of maltreatment. However, both researchers examining re-entry and those examining

reports of recurrence of maltreatment report recurrence have both reported a relationship between very brief periods in foster care and higher risk of recurrence (Courtney, 1995; Jonson-Reid, 2003).

Strengths and limitations

The main strengths of the study include the (1) inclusion of multi-level (child, parent, family, community) characteristics and risk factors and an array of public sector services to improve consistency with an ecological perspective, (2) a long follow-up time, and (3) a large sample size. A limitation of the study is the restriction of generalizability to an urban population receiving public assistance. On the other hand, this is certainly a population deserving specific focus, as studies indicate that poor families comprise the majority of the population served by child welfare (DePanfilis & Zuravin, 1999). Another limitation is that we were unable to track services obtained from community medical and mental health agencies not reimbursed by Medicaid nor are we able to compare need (according to a measure of the presence of a mental health disorder) with service use. Because the data are limited to one child randomly selected from each family, a subsequent report of maltreatment could occur that does not list the focal child. Fortunately, prior work on a similar population (Drake et al., 2002) shows that relationships between variables do not change markedly when the unit of analysis is changed from the child to the family level. Another limitation is that the sample is relatively homogenous with regard to income. This means that community factors in our model almost certainly show lower magnitudes of effect than they would in the general population. Despite these limitations, the findings of the current work are consistent with theory regarding the importance of an ecological approach and published empirical work.

Practice and policy implications

Caregiver and child risks are associated with recurrence and child welfare agencies should make special efforts to address these concerns in assessment and service provision. Those cases that come already have known risk factors prior to the initial contact with child welfare (caregiver lacking high school diploma, longer spells on AFDC, caregiver mental health/substance abuse, special education for emotional disturbance, etc.) are particularly likely to be among those who are again re-reported for maltreatment. These cases may require a different approach to intervention, but obtaining this information may be difficult without cross-agency data sharing. The legal, practical and ethical issues corresponding to such a database would need to be considered carefully by state level policy makers at a level higher than the child welfare division, and client protection would have to be the guiding principle in the construction and use of any such database.

The positive association between a permanent exit from a first spell on AFDC and a reduced risk of recurrence may be a proxy for better overall functioning prior to the child welfare contact or improved caregiver self-efficacy or benefits of higher income following the exit. Typically child welfare services focus on parenting. It may be that more attention to improving general caregiver functioning outside just the parenting role would be helpful. Given restraints based on system mission and funding, this is more likely to be accomplished through coordination of services outside child welfare. This finding also suggests that literature regarding successful outcomes from one system may be important in informing research on entries and exits from other systems. We acknowledge that causal connections between participation in child welfare services and recurrence cannot be made absent a randomized experimental design. At a minimum, our findings highlight the need for child welfare researchers to explore the range of child welfare involvement according to the profiles of cases and decision to provide services or not, time served, and the voluntary versus mandated nature of the services.

Research implications

Services and risk factors perform in the model as they would be theoretically anticipated to perform according to an ecological approach, with reasonably strong effects. It makes intuitive sense that participation in various service systems may alter a child's or family's future path (Jonson-Reid, 2004), but thus far little work has been done to incorporate services in multi-level, ecological studies of the etiology of maltreatment. It is important that future research include both measures of need and corresponding measures of service receipt. This is important in order to better understand whether or not service use is uniquely associated with a given outcome or is merely serving as a proxy for the condition leading to the service. Finally, though not included in the present study, longitudinal services data have obvious promise for research on the cost-benefit of programs.

Conclusion

This work highlights the complexity of factors and service systems related to the re-reporting of maltreatment. While call for interagency collaboration is not new, the best timing and stakeholders to engage in this practice are not clear from current research. Nor is it clear that child welfare workers are aware of the range of services a family is engaged in prior to or concurrent with their contact with child welfare. The present study also found a significant continuing risk of re-reporting extending well beyond the typical 3 year follow-up period of most studies. It would be beneficial to better understand how these families that are re-reported several years later differ from those who are re-reported relatively quickly after the first report of maltreatment. Finally, most research focuses on who is re-reported. More attention needs to be paid to the characteristics of those parents and families who appear to have contact with but then successfully exit from social services.

Acknowledgments

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Table 1

Variable Descriptions

Variable	Description	Source
Child Characteristics		
Child age	**Child age at index event in years (birth-11 years)**	**Child abuse reporting**
Child Gender	**Female (yes=1)**	**Child abuse reporting**
Child Racial Category	**Child is "of color". (yes=1)**	**Child abuse reporting**
Medical Risk in Infancy	**Child was born low birthweight (<2500 grams), born with a serious condition, or was treated in the hospital for a condition within first 12 months that increased risk of ongoing delay, (yes=1)**	**Medicaid (hospital care only) & Birth Records**
Family Characteristics		
Caregiver HS Graduation	**Caregiver graduated High School at time of start of AFDC. (yes=1)**	**AFDC/TANF**
Number of Children	**Number of Children in household prior to index (1=1–2; 2=3–5; 3=6 or more)**	**AFDC/TANF**
Caregiver Foster Care	**Caregiver was in foster care as a youth. (yes=1)**	**Foster Care**
Teen Caregiver	**Caregiver age at birth of oldest child (under19; over 19)**	**AFDC/TANF**
Index Maltreatment Report Characteristics		
Maltreatment Type	**Neglect, Physical, Sexual or Mixed.**	**Child abuse reporting**
Number of Victims	**Number in index report (1;more than 1).**	**Child abuse reporting**
Substantiation	**Index event was substantiated (yes=1).**	**Child abuse reporting**
Caregiver Service Sector Participation		
Caregiver MH/SA[1] Tx Prior	**Caregiver Medicaid Treatment for MH/SA prior to Index (yes=1)**	**Medicaid (inpatient and outpatient)**
Caregiver MH/SA[1] Tx After	**Caregiver Medicaid Treatment for MH/SA after but within one year of Index (yes=1)**	**Medicaid (inpatient and outpatient)**
AFDC exit Prior	**Permanent Exit from 1st known spell on AFDC shortly before Index (yes=1)**	**AFDC/TANF; Foster Care; Corrections; Death**
AFDC exit After	**Permanent Exit from 1st known spell on AFDC after but within one year of Index (yes=1)***	**AFDC/TANF; Foster Care; Corrections; Death**
Child Welfare Services At or Following Index and Prior to Recurrence		
Unserved	**Services need indicated but no services started (yes=1)**	**Child abuse reporting, In-home Services, Foster Care**
FCS[2] Only	**Family Centered Services only (yes=1)**	
FCS & FPS[3]	**FPS with or without FCS (no foster care) (yes=1)**	
Foster Care	**Foster Care (yes=1)**	
None needed	**No service need indicated or received (yes=1)**	
Children's Service Sector Participation		
Child Special Education	**Child has record of special education, prior or within 1 year of index (yes=1). Broken out by Disability type (Emotional Disturbance vs. Other disability)**	**Special Education**
Child Medicaid MH/SA	**Child Medicaid mental health or substance abuse treatment prior or within 1 year of index(yes=1).**	**Medicaid (inpatient and outpatient)**
Child Chronic Health	**Child Medicaid record for hospital care for a chronic condition (e.g., asthma, cerebral palsy, diabetes, etc.) prior or within 1 year of index (yes=1).**	**Medicaid (hospital care only)**
Child Juvenile Court	**Child had a juvenile court petition (status or delinquency) prior or within 1 year of index(yes=1).**	**Juvenile Court**

Variable	Description	Source
Neighborhood Characteristics		
Neighborhood Crime	**Violent crime rate per 1000 people per year in tract.**	**Law Enforcement**
Neighborhood Household Income	**Median Income of Households in tract in thousands**	**1990 Census**
Neighborhood Mobility	**Percentage moved within last 5 years in tract**	**1990 Census**

[1] = MH/SA is Mental Health and/or Substance Abuse;

[2] =less intensive in-home child welfare services;

[3] = more intensive family preservation services

Table 2

Children Birth through age 11: Percent Re-reported at 3 and 7.5 years Controlling for Time

Variable and Log Rank Statistic	Value	N	3 Year Recur	7.5 year Recur
Child age at initial report	0 to 1	1376	49.9%	67.2%
	2 to 4	1494	45.0%	61.9%
	5 to 9	1649	46.2%	60.2%
p<.0001	10 and 11	438	48.2%	60.2%
Child gender	Male	2529	47.6%	63.2%
p=NS	Female	2428	46.4%	62.2%
Child ethnicity	Not Person of Color	1248	48.3%	62.4%
p=NS	Person of Color	3709	46.6%	62.8%
Child medical risk within infancy	No	4193	46.7%	62.7%
p=NS	Yes	764	48.9%	67.3%
Number of children in household (Prior to index)	1–2	2182	42.4%	57.7%
	3–5	2388	48.8%	65.0%
p< 0.0001	6+	387	62.5%	76.8%
Caregiver graduated high school	No	2619	50.4%	67.0%
p<0.0001	Yes	2338	43.3%	57.9%
Age of caregiver at birth of oldest child	<19	1729	48.2%	65.1%
p=.043	19+	3228	46.4%	61.4%
Type of maltreatment	Neglect	3292	50.6%	65.4%
	Physical	1180	39.7%	57.5%
	Sexual	305	36.1%	52.3%
p< 0.0001	Mixed	180	47.7%	66.5%
Index report was substantiated	No	3911	46.9%	62.7%
p=NS	Yes	1046	47.5%	62.7%
Number of child victims on index report	1	3034	42.3%	59.0%
p<.0001	2+	1923	54.4%	68.5%
Caregiver was in foster care as a youth	No	4719	46.7%	62.4%
p=.025	Yes	238	53.3%	68.5%
Caregiver M.H./S.A.[1] Medicaid Treatment	No	4606	46.3%	61.8%
	Prior to Index	254	59.4%	79.2%
p< 0.0001	After: Within 1 year of Index	97	49.0%	64.8%
AFDC Exit (Permanent exit vs not)	No Permanent Exit	4548	48.9%	64.9%
	Prior to Index	113	31.9%	46.2%
p< 0.0001	After: Within 1 year of Index	296	24.1%	35.3%

Variable and Log Rank Statistic	Value	N	3 Year Recur	7.5 year Recur
Child welfare service provided after index report	No Need Identified	4024	47.7%	63.3%
	FCS Only	454	35.9%	50.0%
	FPS or FCS & FPS	97	56.9%	72.0%
	Foster Care	219	40.3%	64.5%
p< 0.0001	Unserved Need Indicated	163	62.0%	76.7%
Violent crime report rate PER 1000 people in tract	<1.8	2391	45.8%	61.5%
	>=1.8, < 4.5	1116	47.4%	63.2%
	>=4.5	1228	48.9%	64.4%
p=NS	Missing	222	48.2%	63.9%
Median income in census tract	<$10,000	262	48.4%	63.6%
	10,000–20,000	1703	49.3%	67.0%
	20,000–30,000	1511	46.7%	62.5%
	30,000–40,000	1117	45.9%	61.5%
p< 0.0004	40,000 +	364	40.8%	56.2%
Mobility in census tract in last 5 years	<42% in 5 yrs	2415	45.9%	61.3%
p= 0.035	>=42% in last 5	2542	48.1%	64.0%

[1]= MH/SA is Mental Health and/or Substance Abuse

Table 3

Children Aged 4 or older: Percent Re-reported at 3 and 7.5 years Controlling for Time

Variable and Log Rank Statistic	Value	N	3 yrs	7.5 yrs
Child age at index report	4 to 6	826	45.1%	60.6%
	6 to 8	674	46.8%	62.4%
	8 to 10	582	44.6%	57.5%
p=NS	10 and 11	438	48.2%	60.2%
Child gender	Male	1256	47.8%	62.0%
p=.04	Female	1264	44.2%	58.7%
Child ethnicity	Not Person of Color	638	45.7%	60.4%
p=NS	Person of Color	1882	46.1%	60.4%
Child medical risk of delay in infancy	No	2212	45.8%	59.8%
p=NS	Yes	308	47.4%	64.4%
Number of children in household (Prior to index)	1–2	1025	42.9%	55.9%
	3–5	1275	46.1%	62.1%
p< 0.0001	6+	220	59.3%	71.5%
Caregiver graduated high school	No	1229	49.4%	63.2%
p=0.0004	Yes	1291	42.7%	57.6%
Type of maltreatment	Neglect	1654	48.2%	61.8%
	Physical	602	41.6%	57.3%
	Sexual	182	32.4%	53.3%
p< 0.0001	Mixed	82	52.9%	71.5%
Index report was substantiated	No	1940	45.6%	60.4%
p=NS	Yes	580	47.2%	60.4%
Number of child victims on index report	1	1472	41.2%	56.2%
p<.0001	2+	1048	52.7%	66.3%
Caregiver M.H./S.A[1] Medicaid Tx	No	2295	45.1%	59.2%
	Prior to Index	164	56.7%	76.4%
p< 0.0001	Within 1 year of Index	61	49.8%	63.3%
AFDC Exit (Permanent exit vs not)	No Permanent Exit	2285	47.5%	62.1%
	Exit Prior to Index	79	32.9%	46.0%
p< 0.0001	Exit Within 1 yr of Index	156	30.3%	41.8%
Child welfare service provided after index report	No Need Identified	2066	46.7%	61.2%
	FCS Only	255	33.5%	46.1%
	FPS or FCS&FPS	47	63.6%	70.5%
	Foster Care	83	47.5%	70.2%
p< 0.0001	Unserved Need	69	56.5%	71.0%

Variable and Log Rank Statistic	Value	N	3 yrs	7.5 yrs
Child eligible for Special Education for emotional disturbance	No	2456	45.6%	60.1%
	Prior to Index	46	67.4%	76.2%
p=.005	Within 1 year of Index	18	44.4%	62.4%
Child eligible for Special Education for other disability	No	2222	46.4%	60.4%
	Prior to Index	220	42.3%	61.7%
p=NS	Within 1 year of Index	78	44.9%	56.6%
Child M.H./S.A. [1] Medicaid Tx	No	2476	45.5%	59.9%
	Prior to Index	21	71.4%	85.7%
p< 0.0001	Within 1 year of Index	23	75.6%	87.8%
Child Medicaid chronic health hospitalization	No	2467	46.0	60.3%
p=NS	Within 1 year of Index	53	45.3	64.4%
Child delinquency or status offense petition	No	2466	46.0%	60.3%
	Prior to Index	31	56.5%	66.8%
p=NS	Within 1 year of Index	23	34.8%	62.2%
Median income in census tract	<$10,000	140	42.1%	56.8%
	10,000–20,000	854	48.0%	64.7%
	20,000–30,000	781	45.6%	60.0%
	30,000–40,000	569	46.3%	61.3%
p< 0.0004	40,000 +	176	39.8%	53.5%

[1] = MH/SA is Mental Health and/or Substance Abuse

[*] p<=0.05

[**] p<=.01

[***] p<=.0001

Table 4

Cox Regression: Re-report of Maltreatment Among Children ages Birth through 11 years (n=4,957)

Variable	Model 1 Hazard Ratio	Model 2 Hazard Ratio	Model 3 Hazard Ratio	Model 4 Hazard Ratio	Model 5 Hazard Ratio	Model 6 Hazard Ratio
Child Characteristics						
Child age in years at index (0–11)	0.974 ***	0.973 ***	0.974 ***	0.971 ***	0.971 ***	0.970 ***
Child is female	0.963	0.967	0.959	0.962	0.959	0.957
Child is a person of color	0.975	0.955	0.914 *	0.870 **	0.865 ***	0.825 ***
Child Medical Risk in Infancy	0.971	0.960	0.947	0.939	0.941	0.937
Child Characteristics Interactions						
Infant Risk *Time (>12months)	1.187 *	1.199 *	1.208 *	1.196 *	1.200 *	1.201 *
Child age *Time(12<months<36)	1.027 *	1.027 *	1.027 *	1.026 *	1.026 *	1.026 *
Wald Chi-Sq (sandwich) 27.30, df=6, p=.0001						
Index Event Characteristics						
Neglect (Comparison Index Type)		*1.000*	*1.000*	*1.000*	*1.000*	*1.000*
Mixed Type Index Report		0.999	1.004	1.017	1.045	1.045
Physical Abuse		0.822 ***	0.831 ***	0.851 **	0.853 **	0.854 **
Index Report						
Sexual Abuse		0.738 ***	0.748 **	0.744 **	0.738 ***	0.744 ***
Index Report						
Index Report		1.038	1.021	1.017	1.292 ***	1.293 ***
Substantiated						
More than one victim in index report		1.279 ***	1.201 ***	1.218 ***	1.224 ***	1.221 ***
Wald Chi-Sq (sandwich) 124.36, df=11,p<.0001						
Family						
Characteristics						
# children in family (value= 1,2 or 3)			1.193 ***	1.178 ***	1.169 ***	1.162 ***
Caregiver graduated high school			0.827 ***	0.856 ***	0.863 ***	0.878 **

Variable	Model 1 Hazard Ratio	Model 2 Hazard Ratio	Model 3 Hazard Ratio	Model 4 Hazard Ratio	Model 5 Hazard Ratio	Model 6 Hazard Ratio
Wald Chi-Sq (sandwich) 189.53, df=13,p<.0001						
Caregiver Service						
Sector Use						
No Caregiver MH/SA Medicaid Tx				*1.000*	*1.000*	*1.000*
Caregiver M.H./S.A.				1.621 ***	1.577 ***	1.576 ***
Before index						
Caregiver M.H./S.A.				1.114	1.116	1.108
After Index						
Negative Exit or No Permanent Exit				*1.000*	*1.000*	*1.000*
Permanent AFDC exit Before Index				0.672 **	0.679 **	0.878 **
Permanent AFDC exit After Index				0.426 ***	0.432 ***	0.684 **
Wald Chi-Sq (sandwich) 345.81, df=17, p<.0001						
Child Welfare						
Services After Index						
No Need Indicated or Services					*1.000*	*1.000*
FCS service only					0.719 **	0.715 **
FPS or FPS & FCS					1.443 *	1.438 *
Foster care					2.491 **	2.458 **
Service Need but					1.445 **	1.467 **
No Services						
Child Welfare Service						
Interactions						
Substantiation *FCS					0.820	0.831
Substantiation *(FPS or FPS & FCS)					0.557 *	0.553 *
Substantiation *Foster Care					0.481 **	0.480 **
Foster Care *Time (months<57)					0.497 **	0.501 **
Wald Chi-Sq (sandwich) 415.71, df=25, p<.0001						

Variable	Model 1 Hazard Ratio	Model 2 Hazard Ratio	Model 3 Hazard Ratio	Model 4 Hazard Ratio	Model 5 Hazard Ratio	Model 6 Hazard Ratio
Census Tract Characteristics						
Median Family Income in 1000's						0.995 [**]
Wald Chi-Sq (sandwich) 419.07, df=26, p<.0001						

Note: Comparison groups for Multilevel Categorical Variables Provided in Italics

[*] p<=0.05,

[**] p<=.01,

[***] p<=.0001

Table 5

Cox Regression: Re-report of Maltreatment Among Children Ages 4 or Older (n=2,520)

Variable	Model 1 Hazard Ratio	Model 2 Hazard Ratio	Model 3 Hazard Ratio	Model 4 Hazard Ratio	Model 5 Hazard Ratio	Model 6 Hazard Ratio	Model 7 Hazard Ratio
Child Characteristics							
Child Age in Years at Index (4-11)	1.046 **	1.051 **	1.053 **	1.049 **	1.045 *	1.044 *	1.046 *
Child is female	0.899 *	0.898 *	0.894 *	0.896 *	0.903	0.904	0.932
Child of color	0.990	0.985	0.957	0.927	0.908	0.880 *	0.879 *
Child Medical Risk in Infancy (1=yes)	1.077	1.064	1.059	1.046	1.067	1.066	1.080
Child Characteristics Interactions							
Child age *Time in months	0.998 **	0.998 **	0.998 **	0.998 **	0.998 **	0.998 **	0.998 **
Wald Chi-sq (sandwich) =18.16, df=5, p<.003							
Index Event Characteristics							
Neglect (Comparison Type)		*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*
Mixed Type		1.239	1.268	1.252	1.296	1.295	1.310
Physical Abuse		0.926	0.934	0.957	0.962	0.962	0.943
Sexual Abuse		0.861	0.874	0.879	0.865	0.869	0.851
Case Substantiated		1.000	0.933	0.986	1.201 *	1.203 *	1.217 **
More than one victim in index report		1.314 ***	1.259 ***	1.271 ***	1.285 ***	1.284 ***	1.288 ***
Wald Chi-sq (sandwich) = 63.78, df= 10, p<.0001							
Family Characteristics # children in family (values 1,2, or 3)			1.141 **	1.135 **	1.133 **	1.128 **	1.130 **
Caregiver graduated H.S.			0.863 **	0.890 *	0.889 *	0.897 *	0.898 *
Wald Chi-sq (sandwich) = 88.22, df= 12, p<.0001							
Caregiver Service Sector Use							
No Caregiver MH/SA Medicaid Tx				*1.000*	*1.000*	*1.000*	*11.000*
Caregiver M.H./S.A. Prior				1.534 ***	1.493 ***	1.490 ***	11.512 **
Caregiver M.H./S.A. After				1.119	1.147	1.140	1.138
Negative Exit or No Permanent Exit				*1.000*	*1.000*	*1.000*	*1.000*

Drake et al.

Page 27

Variable	Model 1 Hazard Ratio	Model 2 Hazard Ratio	Model 3 Hazard Ratio	Model 4 Hazard Ratio	Model 5 Hazard Ratio	Model 6 Hazard Ratio	Model 7 Hazard Ratio
Permanent AFDC exit Prior				0.671 *	0.674 *	0.676 *	0.694 *
Permanent AFDC exit After				0.557 ***	0.566 ***	0.568 ***	0.560 ***
Wald Chi-sq (sandwich) = 131.20, df= 16, p<.0001							
Child Welfare Services Levels After Index							
No Need Indicated or Services					*1.000*	*1.000*	*1.000*
FCS service only					0.555 **	0.555 **	0.559 **
FPS or FPS & FCS					1.980 *	1.966 *	1.848 *
Foster care					4.350 ***	4.344 **	4.541 ***
Service Need but No Services					1.342	1.359	1.377 *
Child Welfare Service Interactions							
Substantiation * FCS					1.079	1.085	1.054
Substantiation * (FPS or FPS & FCS)					0.433 *	0.438 *	0.430 *
Substantiation * Foster Care					0.466 **	0.460 **	0.428 **
Foster Care * Time (months<57)					0.365 **	0.365 **	0.369 **
Wald Chi-sq (sandwich) = 199.03, df= 24, p<.0001							
Census Tract Characteristics							
Median Family Income in $1,000's						0.997	0.996
Wald Chi-sq (sandwich) = 202.87, df= 25, p<.0001							
Children's Service Sector Participation Prior or Within 1 Year of Index							
Medicaid MH/SA Tx							2.063 ***
SPED (Emotional Disturbance)							1.493 **
SPED (Any Other Disability)							0.917
Juvenile Court Petition							0.610 *
Children's Service Sector Participation Interactions							
Other Disability *							1.623 **
Time(months>36)							

Variable	Model 1 Hazard Ratio	Model 2 Hazard Ratio	Model 3 Hazard Ratio	Model 4 Hazard Ratio	Model 5 Hazard Ratio	Model 6 Hazard Ratio	Model 7 Hazard Ratio
Juvenile Crt Petition *Time in months							1.020[*]

Wald Chi-sq (sandwich) = 275.99, df= 31, p<.0001

Note: Comparison groups for Multilevel Categorical Variables Provided in Italics

[*] p<=0.05,

[**] p<=.01

[***] p<=.0001