ONLINE FIRST

Recidivism in the Child Protection System

Identifying Children at Greatest Risk of Reabuse Among Those Remaining in the Home

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Objective: To identify risk clusters that are associated with higher or lower risk of new abuse reports (rereports) and substantiated rereports (reabuse) in children who remain in the home after an abuse report.

Design: A 5-year prospective cohort study.

Setting: National Survey of Child and Adolescent Well-Being.

Participants: Children reported to the child protection system for child abuse.

Main Exposure: Remaining in the home after an abuse report.

Main Outcome Measure: Incidence of rereports and reabuse.

Results: A total of 2578 children remained in the home following an abuse report, and 44% were rereported within the follow-up period. In bivariate analyses, children with behavior problems (49% vs 38%), caregivers with an abuse history (33% vs 16%) or a child welfare history (38% vs 25%), and families with an annual income lower than $20 000 (70% vs 60%) were more likely to be rereported. Forty-five percent of rereports were substantiated reabuse, but 2 risk clusters had a higher incidence: (1) the cluster with a substantiated index report, having a caregiver without parenting class, non–African American race/ethnicity, and caregiver younger than 41.5 years (54%); and (2) the cluster with a substantiated index report, a caregiver with parenting class, and child age younger than 8.5 years (60%). The lowest risk group for reabuse had a substantiated index report, a caregiver without parenting class, non–African American race/ethnicity, and a caregiver 41.5 years or older (26%).

Conclusions: Among children remaining in the home following an abuse report, specific risk groups have higher and lower incidence of rereports and reabuse. These risk-group categories may be useful to child protection services and others in identifying at-risk children and making decisions about placement and services.

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CHILDREN REPORTED TO child protective services (CPS) frequently are not new to the system; 16% to 42% of children reported for abuse have subsequent reports (rereports).[1-5] Regional cohort studies indicate a 23% to 31% incidence of substantiated rereports (reabuse) within 2 to 3 years of the index report for children remaining at home or reunified with caregivers.[6-8]

Studies identifying reabuse risk factors indicate young children,[1,5,9-11] females,[1,10] parental substance abuse,[1,5,12] child disability,[1,2] poverty,[2,8] and neglect reports[9-11] are associated with reabuse. In a Connecticut study following 244 families with a substantiated abuse report for 18 months, recursive partitioning analysis (RPA) indicated prior CPS involvement was the most important factor in reabuse risk.[13] Other studies have developed actuarial tools aimed at assessing reabuse risk, but these tools do not identify important clinical factors.[14]

Federal and state legislation[15-17] promote family preservation for abused children, so identifying children at risk is important for persons who make crucial decisions regarding child placement. Research shows that caseworkers are not proficient at identifying children at greatest risk of reabuse.[18] For children to safely remain in the home, an understanding of which children are at highest and lowest risk of reabuse is essential. Most risk models are based on associations of single factors with rereports or reabuse, not the interaction of multiple factors in a single

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family. Recursive partitioning analysis is a multivariable targeted clustering procedure that identifies the clusters of factors most significantly associated with the outcome.[19,20] The study aim was to use RPA to identify specific risk groups for rereports and reabuse in US children remaining in the home following an abuse report.

METHODS

DATA SOURCE

With funding and direction from the Administration on Children and Families of the US Department of Health and Human Services, the National Survey for Child and Adolescent Well-Being (NSCAW) is a nationally representative survey of the well-being of children within CPS. The participants were children from birth to 14 years old, randomly recruited from 92 CPS agencies nationwide. Of the 8961 children contacted, 5501 children from unique families enrolled in the study (for a 61% response rate). Baseline interviews and assessments with the children, primary caregivers, and CPS caseworkers were conducted 2 to 6 months after the initial investigation.[21] Using a 5-year prospective cohort design, the sample included children who remained with their primary caregiver, usually their birthparents, following an abuse report. The sample included families regardless of CPS service provision. There was an overall retention rate of 80% throughout the study. This analysis was approved by the institutional review board of the University of Texas Southwestern Medical Center, Dallas.

OUTCOMES AND INDEPENDENT VARIABLES

The primary outcome was any abuse rereport (a new report after the index report) during the 5-year follow-up period. CPS caseworkers, interviewed at 1, 1.5, 3, and 5 years following initial study enrollment, were asked if there had "been any new reports of abuse or neglect involving the child since [the initial report date]?" Children remained in the study sample until a rereport was made.

A reabuse variable was created using the sample of 1139 children with rereports. Caseworkers were prompted to classify the rereport as substantiated, indicated, or neither. Child abuse victimization customarily is defined as a substantiated case (when the abuse allegation is supported following investigation) or indicated case (when abuse cannot be substantiated under state policy, but there is reason to believe the allegation)[22]; therefore, a dichotomous variable (reabuse vs no reabuse) was created, classifying "substantiated" or "indicated" as reabuse.

Independent variables were collected at the baseline interview only.

Child

Child characteristics included age, sex, race/ethnicity (by caregiver report), and health. Health included a caregiver report of chronic illness ("any health problem that lasts a long time or comes back again and again") and a caseworker's report of developmental disability ("Does [child] have a special need? A special need is a developmental disability"). A child at least 2 years old was identified as having a behavior problem for a score in the clinical range (T score $\geq$64) on the internalizing or externalizing scales of the Child Behavior Checklist,[23] a standardized measure of emotional and behavior problems, based on caregiver evaluation.[19]

Caregiver

Caregiver characteristics included self-reported age, marital status (married vs not married), employment status (full- or part-time vs other), educational attainment (at least a high school diploma or GED vs not a high school graduate), and health. Physical and emotional health functioning during the past 4 weeks were determined using the questions, "Have you accomplished less than you would like in your work or other regular daily activities as a result of your physical health?" or "as a result of any emotional problems such as feeling depressed or anxious?" Caseworkers were asked to identify, at the time of investigation, if caregivers had mental health problems, unreal expectations of the child, a CPS history, or a personal history of abuse; used excessive or inappropriate discipline; or were active drug or alcohol abusers.

Family and Environment

Caseworkers reported on family characteristics, including family stress (as a result of unemployment, drug use, poverty, or neighborhood violence), poor social support (including family and community support), and active domestic violence. Caregivers reported the number of children in the household and the annual family income ($<$\$20 000 vs $\geq$\$20 000).

Index Abuse History and CPS Services

Index report details included the most serious abuse type, per report: physical or sexual abuse, neglect or abandonment, or other (exploitation, and emotional, educational, or moral or legal maltreatment); the perpetrator; disposition (substantiated/indicated or unsubstantiated); and any CPS history (for the child). At the 1-year follow-up, caseworkers provided service referrals, including drug/alcohol dependence, domestic violence, and parenting classes.

STATISTICAL ANALYSIS

All reported cases in which the child remained in the home were included in bivariate analyses because studies have shown that report substantiation does not correlate with future risk.[2,24] Bivariate analyses using χ^2 tests and nonparametric Wilcoxon tests compared all independent variables in children with a rereport vs those without a rereport. We used SAS statistical software (version 9.1; SAS Institute Inc, Cary, North Carolina) and NSCAW weights were used for bivariate analyses. Adjustments for multiple comparisons are not indicated in RPAs, given that the focus is splitting by risk and identifying clinically meaningful risk clusters.

Recursive partitioning analysis is a multivariable targeted clustering procedure that systematically evaluates all independent variables and identifies variables producing the best binary splits, dividing the data into higher-risk and lower-risk groups. It does not use *P* values in determining branch points. For continuous variables, the analysis creates a binary split at the level of highest statistical significance.[22] After each split, the analysis starts again with the new subgroup and evaluates the independent variables to find the next split that best separates higher- and lower-risk groups. The process continues until there are no variables that significantly change the risk. Full details of RPA have been described elsewhere.[25] After the initial tree is created, cross-validation determines the best number of branch points, assuring a low error rate and preventing overfitting (where the tree does not generalize to other data). The cross-validation, using the 10-fold method and the 1 standard error rule, "prunes" the tree,[26] and has been used in several other stud-

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Table 1. Association of Characteristics of US Children Who Remain in the Home and Their Caregivers With Rereports of Child Abuse[a]

Characteristic	Rereport of Abuse (n=2578 Children) Yes (n=1139 [44%])	No (n=1439 [56%])	*P* Value
Child			
Age, y			
≤2	17.6	19.4	<.01
3-5	26.8	15.2	
6-10	38.3	36.5	
>10	17.4	29.0	
Has behavior problems	49.2	37.5	.01
Has a developmental disability	25.8	18.3	.03
Female	48.1	50.4	.60
Has a chronic illness	21.5	20.3	.75
Race/ethnicity			
White	43.6	41.7	.76
African American	26.8	28.0	
Latino	22.8	21.1	
Other	6.8	9.2	
Primary caregiver			
Age, mean (SD), y	32.2 (0.6)	33.1 (0.5)	<.01
History of abuse or neglect	32.7	16.2	<.01
CPS history	37.9	24.8	<.01
In past 4 weeks, limited ability to work due to:			
Health	31.7	27.4	.03
Emotions	36.3	23.5	.03
Marital status: single	74.8	69.8	.20
Had at the time of investigation:			
Active drug abuse	6.0	7.9	.26
Active alcohol abuse	7.9	6.2	.31
Excessive/inappropriate discipline	8.9	10.5	.32
Unreal expectations of child	19.1	16.5	.38
High school graduate or GED	65.0	68.4	.42
Employed full- or part-time	50.6	55.3	.49
Mental health problem	15.5	16.2	.81

Abbreviations: CPS, child protective services; GED, General Educational Development.
[a] Data are given as percentages unless otherwise indicated.

Table 2. Association of Home Environment, Abuse History, and Child Welfare Services With Rereports of Child Abuse Among Children Remaining in the Home[a]

Characteristic	Rereport of Abuse (n=2578 Children) Yes (n=1139)	No (n=1439)	*P* Value
Family and environment			
Active domestic violence	9.6	16.9	<.01
Household income <$20 000	69.7	59.6	.02
Low social support	36.8	30.5	.14
Children in household, mean (SD), No.	3.2 (0.1)	3.2 (0.1)	.37
High level of family stress	57.1	53.4	.43
Index abuse history			
Substantiated abuse	27.0	39.1	<.01
Prior abuse report	66.8	45.9	<.01
Prior substantiated abuse	33.8	20.0	<.01
Perpetrator			
Mother	37.5	46.9	.69
Father	26.0	27.4	
Stepparent	12.1	10.7	
Paramour	9.9	3.9	
Relative	6.6	4.7	
Other	8.0	6.5	
Most serious abuse type			
Physical	26.0	25.9	.99
Sexual	11.9	11.4	
Neglect	47.0	46.5	
Other	15.1	16.2	
CPS services			
Parenting classes	34.3	27.6	.18
Any service provision after index report	33.6	38.2	.25
Referred for drug/alcohol dependence	29.3	32.6	.74
Referred for domestic violence support	49.1	49.1	>.99

Abbreviation: CPS, child protective services.
[a] Data are given as percentages unless otherwise indicated.

ies.[27-29] All RPA analyses were performed using R statistical software (version 2.9.1; R Development Core Team, Vienna, Austria).

Recursive partitioning analysis used variables with $P<.15$ in bivariate analysis and additional variables based on clinical relevance. Race/ethnicity and caregiver mental health problems were included because these factors have been associated with overall abuse risk.[30,31] Service provision was included as an additional variable to reflect caseworkers' concerns about a family.[2] Individuals with missing data were given a surrogate variable, by the computer program, so that all children remained in the RPA.

RESULTS

BIVARIATE ANALYSIS

Child

Of 2578 children remaining in the home after abuse reports, 44% were rereported during the 5-year follow-up period (**Table 1**). Comparing children with and without rereports, there were significantly more rereports for toddlers (3-5 years), school-age children (6-10 years), and children with behavior problems and developmental disabilities. There was no significant difference in rereports by sex, chronic illness, or race/ethnicity.

Caregiver

Caregivers who were younger, had an abuse history, CPS history, or experienced health and emotional limitations to work were more likely to have rereports. There was no difference in rereports by caregivers' marital status, alcohol/drug use, use of excessive discipline, unreal expectations of the child, high school graduation rates, employment, or mental health problems.

Family and Environment

Families with active domestic violence were less likely to have rereports (**Table 2**). Families with an annual income of less than $20 000 were more likely to have rereports. Social support, the number of children in the home, and family stress did not significantly differ between groups.

Index Abuse History and CPS Services

Children with substantiated index reports were less likely to be rereported. Both children with a history of abuse re-

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ports and substantiated reports (before index report), however, were more likely to be rereported. The perpetrator, abuse type, and provision of CPS services after the index report were not significantly associated with rereports.

RECURSIVE PARTITIONING

Recursive partitioning analysis for rereports created a large tree in which substantiation of the index report was the initial splitting variable. For simplicity, separate trees are shown for unsubstantiated and substantiated index reports. Among 800 children remaining in the home after unsubstantiated abuse reports, 56% were rereported (**Figure 1**). Incidence of rereports increased to 60% among children with an annual family income of less than $20 000, vs 47% for those with an income of $20 000 or higher. Among children with an annual family income of $20 000 or higher, incidence of rereports increased to 61% in children with behavior problems, vs 38% in children without behavior problems.

Of the 1252 substantiated index reports, 38% were rereported (**Figure 2**). Incidence of rereports increased to 66% if the caregiver had an abuse history and the child was younger than 12.5 years with behavior problems. The incidence of rereports increased to 86% if the caregiver had an abuse history, if the child was younger than 12.5 years without behavior problems, if the caregiver was younger than 33.5 years old, and if there were 5 or more children in the home. If there were fewer than 5 children in the home, the incidence of rereports was 62% among caregivers with mental health problems. Two groups had a lower incidence of rereports: (1) the group in which the caregiver had an abuse history and child was 12.5 years or older (12%), and (2) the group in which the caregiver had an abuse history, the child was younger than 12.5 years and without behavior problems, and the caregiver was 33.5 years or older (25%).

Among the 1139 rereports, 45% were substantiated reabuse (**Figure 3**). In the risk cluster consisting of a substantiated index report, the caregiver not receiving a parenting class, being of non–African American race/ethnicity, and being younger than 41.5 years old, 54% were reabused. In the risk cluster consisting of a substantiated index report, the caregiver receiving a parenting class, and the child being younger than 8.5 years old, 60% were reabused. In the risk cluster consisting of a substantiated index report, the caregiver receiving no parenting class and of African American race/ethnicity, 37% were reabused. Incidence of reabuse was lowest (26%) for the risk cluster including a substantiated index report and the caregiver receiving no parenting class and being of non–African American race/ethnicity, and being 41.5 years or older.

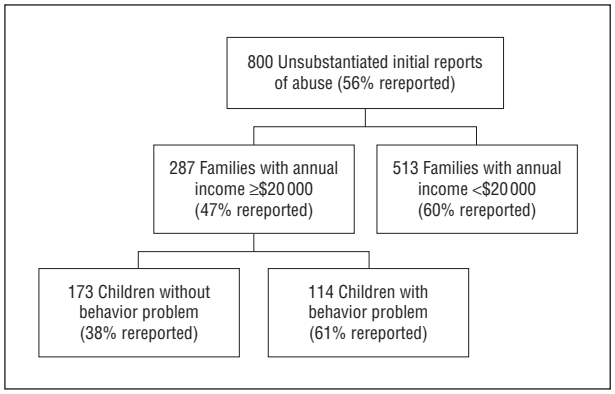


Figure 1. Recursive partitioning analysis of risk factors associated with rereports of children remaining in the home after an unsubstantiated report of abuse.

COMMENT

This is the first national study, to our knowledge, to use recursive partitioning analysis to identify risk clusters that predict a child's risk of rereports and reabuse and to focus on children remaining in the home. The findings, which go beyond prior research via a data-driven approach to identifying risk clusters, demonstrate that some risk factors, when combined, are powerful predictors of a child's future abuse risk. Other non-RPA studies have included children who entered foster care or were placed with relatives. Similar to other studies, a CPS history prior to the index case significantly increased the incidence of rereports.[13] This might indicate the continued presence of risk factors that result in reports or possible caseworker bias. Other risk factors consistent with prior non-RPA work on recidivism include child age,[1,5,9-11] child developmental delays,[1,2] and poverty.[2,8] Some factors (parental substance abuse,[1,5,11] the sex of the child,[1,10] and abuse type[3,9-11]) may be important when evaluating all reported children, but did not seem relevant when focusing on risk clusters for children remaining in the home. Parental substance abuse and some types of abuse may require removing the child from the home, making these factors less pertinent to the population focus of this study.

Domestic violence was associated with lower abuse recidivism in the bivariate analysis. This might indicate that children with active domestic violence in the home are more likely to be removed from the home or that the family is provided with more monitoring and services to maximize safety. Additional research on this issue is needed.

Recursive partitioning analysis integrates multiple factors into final risk clusters, allowing for sophisticated identification of risk. Lower-risk clusters identified for rereports include unsubstantiated index reports, higher annual income, and no child behavior problems (Figure 1); substantiated index reports, caregivers with an abuse history, and younger children (Figure 2); and substantiated index reports, older caregivers with an abuse history, and older children without behavior problems (Figure 2). The lower-risk cluster identified for reabuse includes substantiated index reports, no parenting class, non–African American race/ethnicity, and older caregivers (Figure 3). Higher-risk clusters identified for rereports include unsubstantiated index reports, higher annual income, and child behavior problems (Figure 1); substantiated index reports, older caregivers with an abuse history, younger children without behavior problems, and more children in the home (Figure 2); and substanti-

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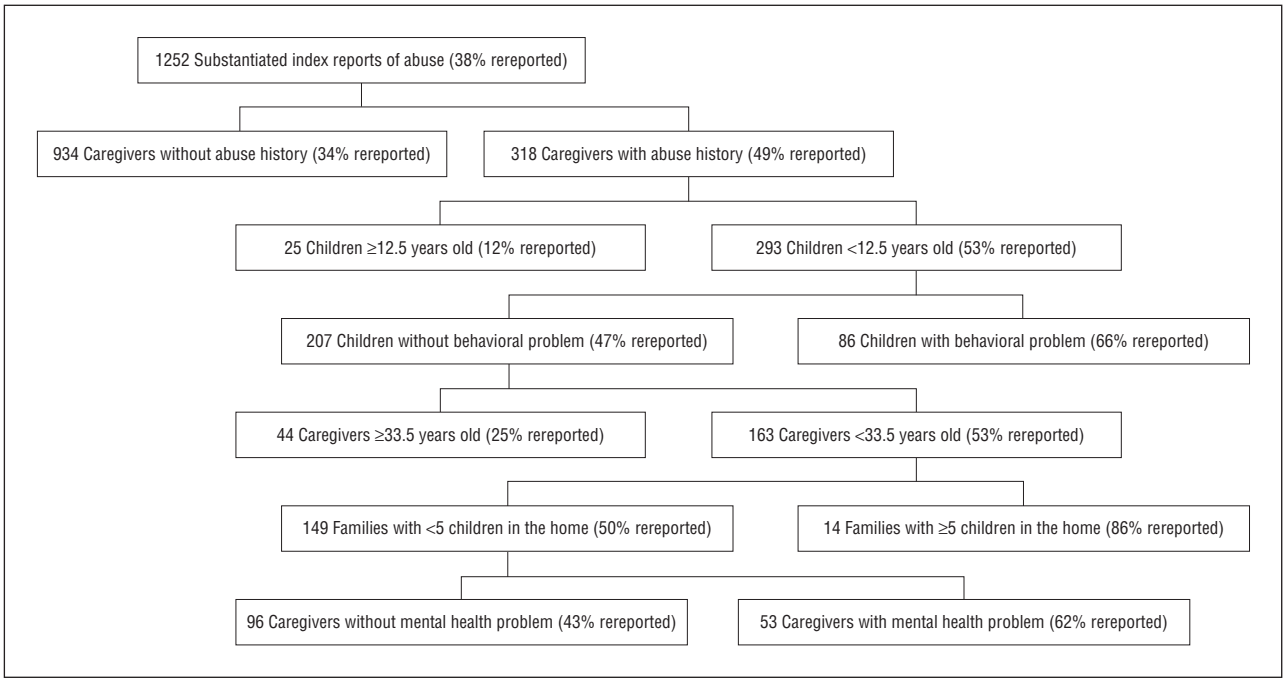


Figure 2. Recursive partitioning analysis of risk factors associated with rereports of children remaining in the home after a substantiated report of abuse.

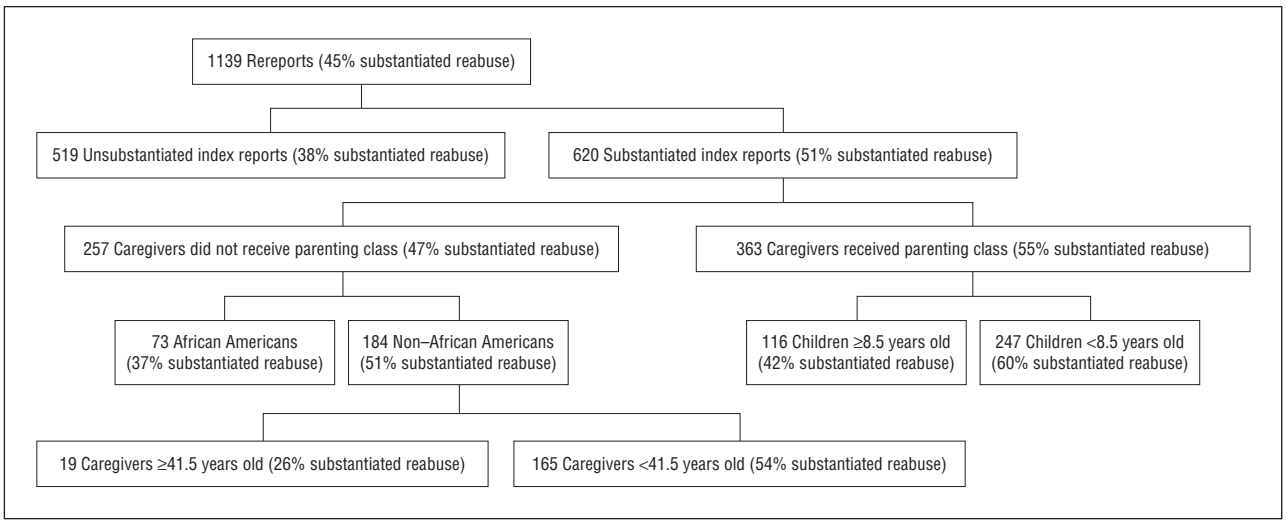


Figure 3. Recursive partitioning analysis of risk factors associated with reabuse of children remaining in the home after the index report.

ated index reports, older caregivers with an abuse history and a mental health problems, younger children without behavior problems, and fewer children in the home (Figure 2). Higher-risk clusters identified for reabuse include substantiated index reports, parenting class, and younger children (Figure 3); and substantiated index reports, no parenting class, non–African American race/ethnicity, and younger caregivers (Figure 3).

Child age, child behavior problems, and caregiver age were entered as markers of both rereports (Figure 2) and reabuse (Figure 3). In unsubstantiated index cases (Figure 1), an annual household income lower than $20 000 was the initial branch factor for rereports (47% vs 60%). The combination, however, of child behavior problems and higher household income resulted in the greatest difference in incidence of rereports (38% vs 61%). The lowest-risk cluster for reabuse (Figure 3) includes substantiated index reports, no parenting class, non–African American race/ethnicity, and older caregivers (26%). One of the highest-risk clusters is the same group, except with younger caregivers (54%). Caregiver age also is an important discriminator for rereports in substantiated index cases (Figure 2), indicating that older caregiver age may decrease risk.

The study findings identify higher-risk clusters for rereports and reabuse. Children and families in these groups might need substantially more support and CPS intervention to keep the child safe in the home. Study findings that parenting classes were associated with increased reabuse risk, especially in families with younger children, might suggest that parenting classes may not be sufficient in length or intensity for some higher-risk

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families. Child protective services might consider prolonged support and supervision or out-of-home placement for children at highest risk of reabuse.

The high incidence of rereports among children with an unsubstantiated index report indicates an urgent need to prevent rereports among families that might not be eligible for CPS services. Impoverished families and children with behavior problems are at high risk of rereports. Providing these families with intensive support services targeting basic needs (shelter, food, employment, and child care), behavioral health services for the child, and medical care might be effective options for CPS to use to protect these children.

Recursive partitioning analysis identified certain lower-risk subgroups. These children and families might benefit from community resources and educational programs but may not need lengthy monitoring and services from CPS. For policymakers, the study results might guide evidence-based distribution of resources. More intensive monitoring and services for the highest-risk families might require more resources; however, lower-risk families might need fewer services and less frequent monitoring. This has the potential to save CPS invaluable time and resources.

Prior studies indicate that risk assessment within CPS can be fraught with challenges, so reliance on caseworker report is a limitation of NSCAW and this study. Recursive partitioning analysis identifies risk clusters; however, it may lead to identification of very high risk groups that are uncommon in the population. In addition, risk factors may differ for different categories of abuse. Not infrequently, different types of abuse co-occur in a single episode or sequentially over time (eg, the first episode of maltreatment is neglect, followed by physical abuse). Future RPA research should determine whether separate models might enhance predictive accuracy.

The study is limited by the available NSCAW data. The survey relied on caseworker interview, without report verification, which is not available through NSCAW. Child protective services frequently experience high caseworker turnover, which may affect reporting of services. In addition, highly mobile families may have been lost to follow-up (although the survey had an 80% retention rate). Surveillance bias may have occurred, because ongoing contact with caseworkers might alter rereports.

The strengths of the study include the large sample size, prospective data collection to limit recall bias, 5-year follow-up, nationally representative prospective sample, and use of RPA.

CONCLUSIONS

Risk clusters for rereports and reabuse were established using RPA. This clustered approach allows for an examination of constellations of factors within families as opposed to identifying single variables associated with risk across families. Segmenting populations into risk subgroups based on clusters of key characteristics may more directly inform case management by highlighting the special needs of high-risk subgroups, as opposed to the average need of all high-risk families. Three higher-risk clusters for rereports were (1) unsubstantiated index reports, higher annual income, and children with behavior problems; (2) substantiated index reports, caregivers with an abuse history, younger children without behavior problems, younger caregivers, and many children in the home; and (3) substantiated index reports, caregivers with an abuse history, younger children without behavior problems, younger caregivers, fewer children in the home, and a caregivers with mental health problems. Two higher-risk clusters for reabuse were (1) substantiated index reports, parenting class, and younger children; and (2) substantiated index reports, no parenting class, non–African American race/ethnicity, and younger caregivers. These findings might be useful to CPS in identifying at-risk children and making evidence-based decisions regarding child placement, families' service needs, and the duration and intensity of monitoring that families require. In addition, the findings might prove useful to policymakers in targeting limited resources to high-risk families.

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Author Contributions: Dr Dakil had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. *Study concept and design:* Dakil, Sakai, and Flores. *Acquisition of data:* Sakai, Lin, and Flores. *Analysis and interpretation of data:* Dakil, Sakai, Lin, and Flores. *Drafting of the manuscript:* Dakil and Sakai. *Critical revision of the manuscript for important intellectual content:* Sakai, Lin, and Flores. *Statistical analysis:* Sakai and Lin. *Administrative, technical, and material support:* Flores. *Study supervision:* Flores.
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