

**Effectiveness Of California's Child Welfare Structured  
Decision-Making (SDM) Model: A Prospective Study of the  
Validity of the California Family Risk Assessment**

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By  
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# **Effectiveness of California's Child Welfare Structured Decision-Making (SDM) Project: A Prospective Study of the Validity of the California Family Risk Assessment**

## **Introduction**

Over the last year and a half, research staff working on the California Child Welfare Structured Decision-making (SDM) Project generated important evidence about the effectiveness of the SDM Project in improving child welfare worker decision-making and child/family outcomes. This report describes the results of the latest efforts to achieve the first goal of SDM—to improve the decision-making capabilities of California's child welfare workers by supplying them with accurate (valid) assessment tools for their use in assessing child welfare cases and making crucial case management decisions. A separate future report will address recent research on the effectiveness of services in improving child and family outcomes, which is the second goal of SDM.

Though more research on SDM is forthcoming, considerable evidence has been generated by project staff analyzing the effectiveness of SDM and it can now be shared. The report provides evidence of important progress to date in meeting goals of the Department of Social Services to improve child welfare practice. The findings are relevant for policy makers, managers, and practitioners attempting to assess the value of SDM for improving child welfare practice in California.

## Executive Summary

### What Is SDM?

- SDM is a set of assessment tools for use by front line child welfare workers and their supervisors. The most important tool among these assessments is a research-based risk assessment that reveals the likelihood that children will be the victims of maltreatment subsequent to receipt of an initial maltreatment report. The SDM tools are used for assessing and deciding how best to serve abused and neglected California children from the time they are reported to child protection agencies through their last service contact with those agencies. SDM includes a complete set of definitions of terms used in all assessments and guidelines for making service decisions (e.g. whether to provide services after investigating allegations of maltreatment) on the basis of assessment results. SDM assessment tools and guidelines have been written into software that has been used successfully in several counties for more than two years. A web-based version of SDM is now available for use. This will allow any California county to use SDM. It will also provide managers, administrators, and staff with enhanced data on child/family assessment results, program operations, and program outcomes for planning, managing, and evaluation purposes.
- In an audit of the California Department of Social Services, the California State Auditor noted that SDM has two purposes. The first is to improve the decision-making capabilities of child welfare workers. Improvements in decision-making are intended to increase the service resources provided to children at the highest risk of future maltreatment. Increasing services provided to higher risk children is intended to achieve the second goal noted by the Auditor—the improvement of outcomes for children and families (California State Auditor, 2000).

### The Focus Of This Report.

This report focuses on the first of SDM's purposes—the capacity of SDM to improve child welfare worker decision-making capabilities. It examines the question of the accuracy of the SDM risk assessment and whether this instrument can contribute to improvement of decision-making capabilities. It also presents evidence regarding the accuracy of other SDM instruments, the SDM Safety Assessment and the SDM Family Strengths and Needs Assessment.

### What Is The SDM Risk Assessment And How Do We Know It's Accurate?

The SDM model employs a research-based risk assessment called the California Family Risk Assessment (CFRA). In counties using SDM<sup>1</sup>, the CFRA is to be completed by child welfare workers at the conclusion of an investigation of reported child maltreatment. The CFRA is used to assist child welfare workers in deciding whether to open a case and

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<sup>1</sup> SDM counties whose data are analyzed in this report are Humboldt, Los Angeles, Orange, San Luis Obispo, and Sutter. A list of all counties participating in the SDM Project is included in Appendix I. Counties and parts of counties currently participating in SDM include more than 70% of California's population.

provide post-investigation services, and if so, how many visits the family should receive per month. SDM guidelines allow child welfare worker discretion but emphasize opening and serving higher risk cases—those assessed as being "high" or "very high" risk, compared to those assessed as having "low" or "moderate" risk. The rationale for opening and serving higher risk cases is that they are statistically significantly more likely than lower risk cases to have maltreatment occurrences/recurrences<sup>2</sup> in the absence of effective services.

During the first six months of 2000, California child welfare workers in five counties used the CFRA in the normal course of their duties to assess a cohort of 7685 families<sup>3</sup> at the conclusion of an initial investigation—called the "index" investigation—which was the first investigation of a particular family conducted pursuant to an initial (index) child abuse/neglect report/referral during the study sampling period of January 1 through June 30, 2000. The families were followed through California's statewide child welfare database (CWS/CMS) for two years from the date of receipt of the index referral to see whether risk ratings made using the CFRA were accurate (i.e. valid) as a means of classifying cases as to likelihood of future maltreatment. With this large cohort of reported families, the CFRA was subjected to, and passed, six tests used to assess the validity of prognostic devices in medicine (Altman and Royston, 2000).

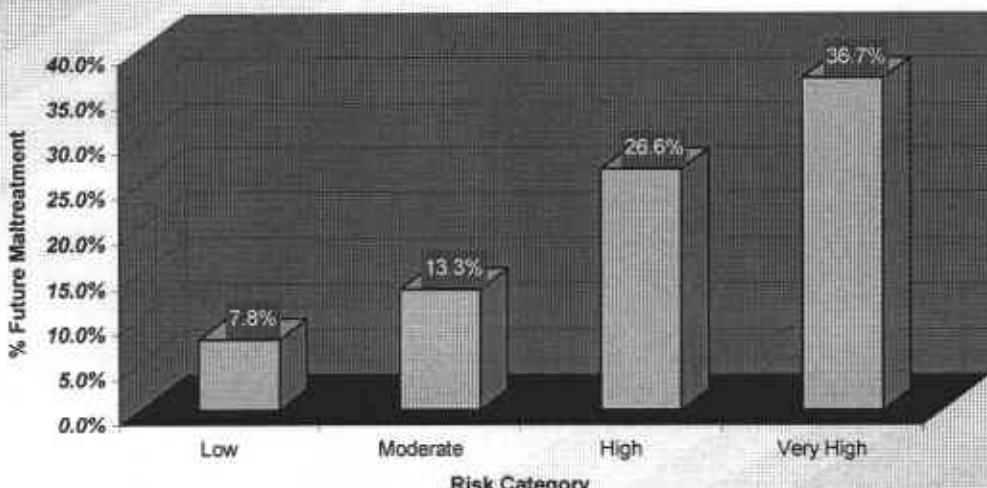
- Among the 7685 families in the study cohort, 6543 received no services after the index investigation. Some risk assessment validity results for these families appear in the bar graph below. The graph shows the percentage of families in each CFRA risk score category that had substantiated incidents of maltreatment within two years of receipt of the initial maltreatment report.
- It is easy to see that in the absence of receipt of effective services, higher CFRA risk scores are associated with higher rates of maltreatment subsequent to assessment with the CFRA. Thus, future maltreatment is a "positive monotonic function" of risk scores—i.e. as risk scores rise, future maltreatment rates rise. This is the most important and revealing of the Altman-Royston tests.

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<sup>2</sup> Maltreatment occurrences and recurrences are incidents of physical abuse, sexual abuse, neglect, emotional abuse, or caretaker absence/incapacity substantiated by investigating child welfare workers.

<sup>3</sup> Major findings of the above-described analysis of risk assessment accuracy, as well as other findings discussed in the report, are based on two data samples. One is a sample of 6543 investigated families whose risk of maltreatment recurrence was assessed by child welfare workers in five California counties. These families were followed statewide for two years after being assessed to determine whether their children experienced substantiated maltreatment occurrence or recurrence and/or re-referral/reinvestigation. To insure that the maltreatment occurrence/recurrence and re-referral/reinvestigation outcomes observed in these cases were due to risk alone, this sample included only families that received no post-investigation services.

**FIGURE 1**  
**ALL CASES CLOSED AFTER INVESTIGATION, N = 6543, FUTURE MALTREATMENT WITHIN  
 24 MOS. OF INITIAL REFERRAL**



In addition to the Altman-Royston tests, other kinds of analysis were conducted to check two possibilities. One is the possibility of a spurious (i.e. false) relationship between CFRA risk scores and future maltreatment.

- Sometimes there appears to be an association like that in Figure 1, above, when in reality, there is no association and the appearance of an association is caused by other variables that are related to both members of the pair of variables whose relationship is of central concern—CFRA risk scores and future maltreatment rates.

A second check was conducted for "interaction" between CFRA risk scores and other variables.

- Through analysis of interaction it can be determined whether the desired positive monotonic relationship of future maltreatment rates to CFRA risk scores—i.e. as risk scores rise, future maltreatment rates rise—is present for families falling in the various categories defined by "extraneous variables"—variables whose relationship to future maltreatment is not the central focus of analysis, but which may interact with CFRA risk scores in their relationship to future maltreatment rates.
- An example of an interaction might be a finding that, among African Americans, future maltreatment rates do not rise as CFRA risk scores rise. This would mean that the CFRA didn't work as it should for African American families and that these families would be likely to be mislabeled as to actual risk using the CFRA.

- Use of the CFRA with these families could mean that we are describing some of them as "high-risk", when, in fact, their children are no more likely than white children labeled "low-risk" to experience a future incident of maltreatment.
- Clearly this is unacceptable and the requisite analysis must be conducted to rule it out.
- Some of the results of logistic regressions to check for a spurious (false) relationship of CFRA scores with future maltreatment and to check for interaction effects are presented below.

### **Results Of Logistic Regression To Check The Possibility of Spuriousness**

In order to check the possibility of a spurious relationship between CFRA risk scores and future maltreatment rates, logistic regression analyses of this relationship were conducted controlling for the effects of the following extraneous variables: (1) race/ethnicity; (2) county/community size; (3) initial (i.e. "index") investigation disposition; (4) receipt of post investigation services; and (5) child safety determination (including out-of-home placement).

Despite the operation of the above extraneous variables, and consistent with the positive monotonic relation of the CFRA risk score-future maltreatment relationship illustrated in Figure 1, above, it was found that as CFRA risk scores rise, the likelihood of future maltreatment increases, as follows:

- Moderate-risk cases are 1.64 times (64%) more likely than low-risk cases to have future substantiated maltreatment incidents within two years of an initial report ( $p. < .0005$ ).
- High-risk cases are 3.33 times (233%) more likely than low-risk cases to have such incidents ( $p. < .0005$ ).
- Very high-risk cases are 5.11 times (411%) more likely than low-risk cases to have such incidents ( $p. < .0005$ ).
- *These findings show that as risk scores rise, future maltreatment rates rise, despite the effects of the variables controlled in the analysis. Thus, the relationship depicted in Figure 1, above, does not appear to be a spurious one with the specified extraneous variables controlled statistically.*

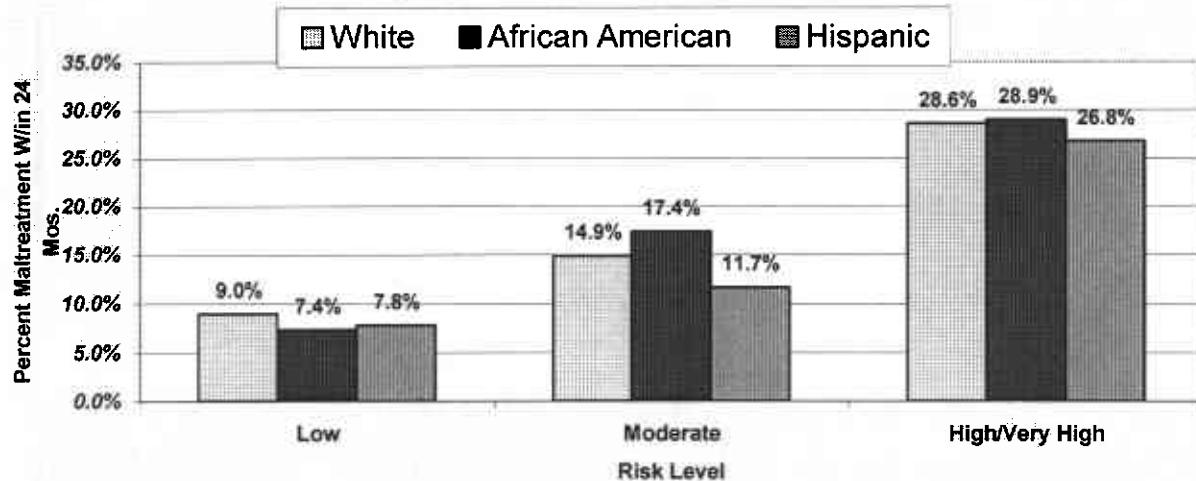
## An Example of Results Of Logistic Regressions To Check The Possibility Of Interaction

Figure 3, below, shows that the relationship of CFRA risk scores to future maltreatment rates is the same among members of each of America's largest racial/ethnic categories. There is no statistically significant interaction found between race/ethnicity and CFRA risk scores as they relate to future maltreatment rates.

- In the absence of interaction, we see that as CFRA risk scores rise, future maltreatment rates rise within the white, African American, and Hispanic sub-samples analyzed here.

**FIGURE 3**

**Maltreatment Occurrence/Recurrence Within 24 Mos. Of Initial Referral  
for 6543 Families at Low, Moderate, and High/Very High Risk Who  
Received No Service After Investigation. (White [N = 2427], African  
Amer. [N = 381], Hispanic [N = 3021]).**



Two particularly important findings on risk and race/ethnicity, unrelated to the interaction analysis, are the following:

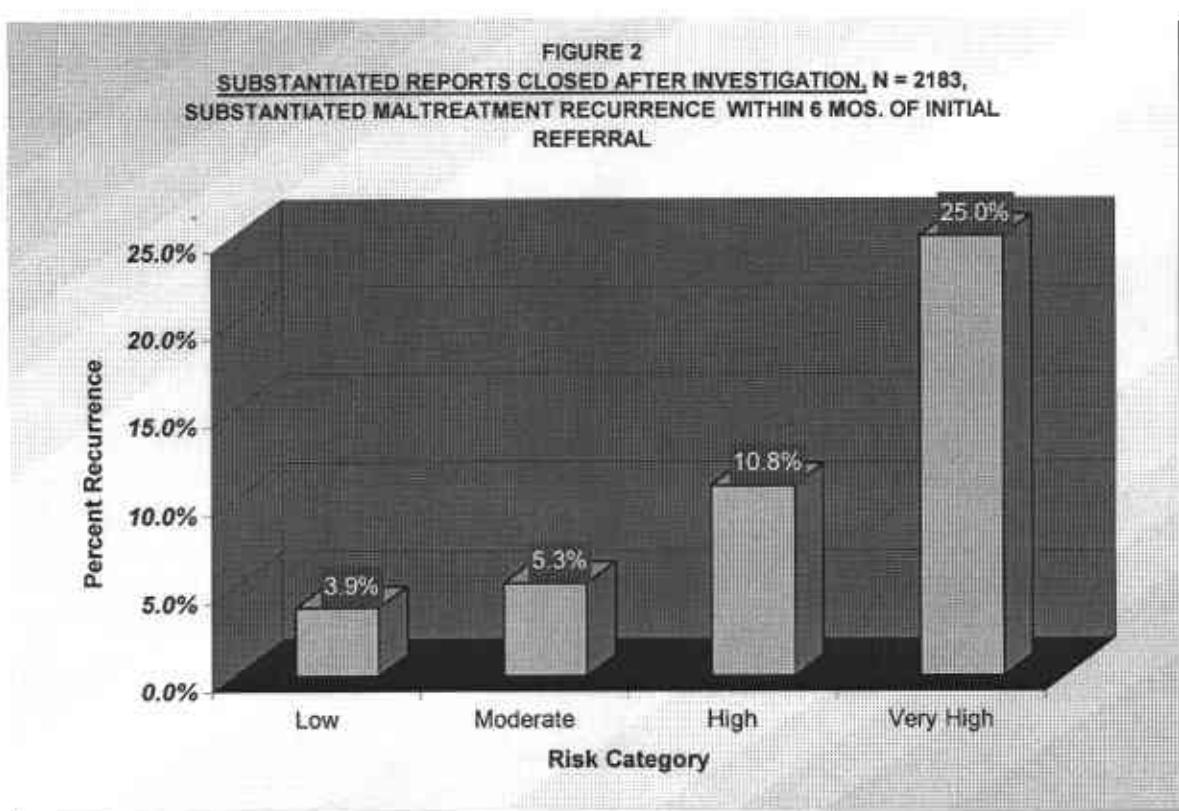
- First, with the present sample, members of racial/ethnic minority groups are significantly less likely than whites to be labeled as "high" or "very high-risk" using the CFRA. These findings are consistent with findings from a separate study of the 1995 California data sample used to develop the CFRA. That study is soon to be published by the Child Welfare League of America (Johnson, 2004, in press).
- Because members of minority groups score lower on the CFRA than whites, use of the CFRA could help to reduce the problem of disproportionate representation of members of some racial/ethnic minority groups in the child welfare system.

- Second, for the largest U. S. racial/ethnic sub-populations (Whites, African Americans, Hispanics) who were available for separate study in sufficient numbers in the present sample, results of the analysis offer support for the hypothesis that the CFRA is an equitable means of identifying families that are likely to maltreat their children in the future. "Equity" or "fairness" means that families in different racial/ethnic categories who have the same CFRA scores (low or moderate or high/very high-risk) should have similar rates of future maltreatment (i.e. similar amounts of the construct [risk of future maltreatment] that the test [the CFRA] is intended to measure) (American Educational Research Association, et al., 1999)

### **The Utility Of The CFRA As An Assessment Of Likelihood Of Maltreatment Recurrence Within Six Months Of A Substantiated Initial Report**

Under Federal procedures for measuring maltreatment recurrence as a child safety outcome criterion, families are followed for six months from the receipt of the initial substantiated report to see whether another substantiated incident of maltreatment occurs (U. S. Department of Health and Human Services, 2000). To comply with recently issued Federal child safety outcome requirements, states will have to reduce their rates of maltreatment recurrence within 6 months of an initial substantiated report to 6.1% or less for statewide caseloads. In order to comply with the new federal regulations it will be helpful for states, including California, to be able to identify those families whose initial maltreatment reports are substantiated who are at highest risk of having another substantiated maltreatment incident within 6 months of the initial report.

- Employed as an assessment of the likelihood that families will have another substantiated incident of child maltreatment within six months of an initial substantiated report, the CFRA passed 5 of six of the Altman-Royston validity tests conducted as part of this study. Used to assess the likelihood of maltreatment recurrence within six months of an initial substantiated report, the CFRA also passed a test of spuriousness like those described above.
- It appears that only minor adjustments in the CFRA would be required to enable it to pass all 6 Altman-Royston validity tests. Thus, with some adjustments, the CFRA is a candidate for use by California counties to identify families who must be effectively served to keep maltreatment recurrence rates at or below the Federally prescribed maximum of 6.1% within six months of an initial substantiated report.
- Figure 2, on the next page, shows that for families receiving no post-investigation services, maltreatment recurrence within 6 months of an initial substantiated maltreatment report is a positive monotonic function of CFRA risk scores—as risk scores rise, future maltreatment recurrence rates rise.



Logistic regression analysis controlling for the effects of numerous variables capable of influencing maltreatment recurrence *within six months of an initial substantiated report* indicates the following:

- Moderate-risk cases are 1.45 times (45%) more likely than low-risk cases to have future substantiated maltreatment incidents within six months of an initial report.
- High-risk cases are 3.08 times (208%) more likely than low-risk cases to have such incidents.
- Very high-risk cases are 4.23 times (323%) more likely than low-risk cases to have such incidents.

### **Ability Of The CFRA To Improve Child Welfare Worker Decision-making**

Procedures for use of the CFRA provide for child welfare worker override (i.e. modification) of the risk assessment finding. If the child welfare worker sees circumstances that suggest the actual risk to the children is different than scored risk, the scored risk finding can be overridden and a different risk level assigned to the case. Child welfare workers overrode the risk rating obtained using the CFRA in a sub-sample of 114 of the 7685 cases analyzed in this report. Analyzing these cases it was possible to study both scored risk

values and risk values assigned by child welfare worker override of CFRA scores, in relation to maltreatment recurrence and re-referral/re-investigation within 24 months of the initial referral. The findings were as follows:

- Scored risk (with no child welfare worker override or adjustment) was statistically significantly related to both maltreatment recurrence and re-referral/reinvestigation in the expected direction.
  - This means that higher risk cases—based on CFRA scores—were more likely to be maltreated again and to be re-referred and reinvestigated.
- Risk values assigned to the same cases by child welfare workers believing the CFRA instrument findings were inaccurate were *not* statistically significantly related to either maltreatment recurrence or re-referral/reinvestigation.
  - This means that cases whose risk ratings were bumped up to higher levels by child welfare workers who rejected lower, unadjusted CFRA risk ratings were no more likely than lower risk cases to have maltreatment recurrences or re-referral/reinvestigation.
- This does not mean that clinical judgement can be dispensed with in risk assessment. Good clinical judgement is a requisite for rating more than half of the items contained in the CFRA. It is also required for evaluating the reasonableness of the overall risk score produced by the CFRA. This is because the circumstances that can affect risk to children are too numerous to be included in a research-based risk assessment, if it is to be of reasonable length. Good clinical judgement is therefore required to assess circumstances not included on the CFRA in order to decide upon the appropriateness of overriding the CFRA score.
- Generally, however, the evidence presented here indicates that reliance on the CFRA risk score for an overall assessment of risk improves risk assessment accuracy.
- This finding is consistent with a very large body of evidence from a variety of fields reviewed in Science Magazine, the journal of the American Association for the Advancement of Science, and evidence appearing in child welfare research journals (Dawes, Faust, and Meehl, 1989; Baird, et. al, 1999; Baird and Wagner, 2000).

## **Evidence Of The Validity Of The SDM Safety Assessment And Strengths And Needs Assessments**

Presently available data contain evidence of the validity of the SDM Safety Assessment, used to decide whether children can remain safely with their parents pending completion of an investigation. SDM Safety Assessment decisions are strongly correlated with risk assessment scores ( $r = .50$ ,  $p. < .0005$ ), providing some evidence of validity (accuracy) of the Safety Assessment scores. SDM Family Strengths and Needs Assessment scores are also correlated with CFRA scores ( $r = .34$ ,  $p. < .0005$ ), providing some evidence of the validity of the Family Strengths and Needs Assessment.

- These correlations among assessment scores give some assurance that there will be congruence in assessment results arrived at by different child welfare workers assessing the same cases. Starkly inconsistent, incongruent assessment results are a feature of many news stories depicting failures of the child welfare system to protect vulnerable children.
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### **Questions About the Report?**

The author will be happy to answer any questions that readers may have about the report. A planned future report on the SDM Project will present more technical information on evaluation methodology and study procedures, and will integrate additional published research bearing on the methods and conclusions of this report. The author was Research Director for the California Child Welfare SDM Project from 1997-2003. He is now Director of Evaluation, Research, and Program Performance, Alameda County Social Services Agency, Oakland, California. He may be reached at 510-271-9114, or by e-mail at [wjohnso@acgov.org](mailto:wjohnso@acgov.org).

### **Organization Of The Body Of The Report**

To provide background on the SDM model, a brief introduction to SDM, entitled "**What is SDM?**" appears below. This section contains details about the SDM Project not included in the Executive Summary. Following this is a short section entitled "**Testing the Effectiveness of SDM—What was studied?**". This describes in general terms the subjects addressed by the report. Subsequent to these introductory sections, the major parts of the report are the following: I. Study Questions and Research Design; II. Instruments and Measures III; Data Sources and Samples IV; Results, Study Questions 1-12.

### **What is SDM?**

SDM is a set of assessment tools for use by front line child welfare workers and their supervisors. A list of SDM assessment instruments and the decision points they address is included in Appendix I of the report. The most important tool among these assessments is a research-based risk assessment that reveals the likelihood that children will be the victims of

future maltreatment by their caregivers. The SDM tools are used for assessing and deciding how best to serve abused and neglected California children from the time they are reported to child protection agencies through case closure. SDM includes a complete set of definitions of terms used in all assessments and guidelines for making service decisions (e.g. whether to provide services after investigating allegations of maltreatment) on the basis of assessment results. SDM provides managers and administrators with data on child welfare operations for use in managing workload and in program management, planning, and evaluation.

- SDM has two purposes. The first is ***to improve child welfare caseworkers' assessment capabilities***. These improvements are important in order to identify and provide more services to the highest risk, least safe California children. Provision of more services to these children is aimed at accomplishing the second purpose of SDM—***improvements in child and family outcomes***. Particularly important outcomes are the reduction of recurrence of child maltreatment, child injury, placement in foster care, and re-referral/ reinvestigation among children and families who have come to the attention of child protective services (CPS). ***In public health terminology, this outcome focus is called tertiary prevention.***

Working with the Children's Research Center<sup>4</sup>(CRC), the California Department of Social Services and volunteer California counties (see list in Appendix I) have created an SDM model for California. The SDM model includes case assessment instruments, definitions of terms used in each assessment, and associated policies and procedures for use in case assessment and in service resource allocation. The model has been implemented in 18 California counties participating voluntarily in the SDM Project over the last two and a half years<sup>5</sup>. A listing of participating counties and their implementation dates is included in Appendix I. A more detailed description of the model and a list of SDM assessment tools and important policies and procedures can be obtained from the SDM Project.

### **Testing the "Effectiveness of SDM"—What was studied?**

This report focuses primarily on the results of tests of the capacity of SDM to improve the decision-making capabilities of social workers through an analysis of the accuracy of the California Family Risk Assessment (CFRA)—a research-based risk assessment developed as part of the SDM model. Findings address the capacity of the CFRA to identify those children reported to have been maltreated who are most likely to be maltreated in the future if they do not receive effective intervention.

A secondary focus of the report is on findings about other consensus-based SDM instruments—the SDM Safety Assessment and Strength & Needs Assessment—that are part

<sup>4</sup> The Children's research Center is a unit of the National Council on Crime and Delinquency (NCCD). NCCD is a non-profit children's research and consulting organization under contract to the California Department of Social Services. They have developed structured decision-making systems for child welfare and adult and juvenile justice organizations in more than a dozen U. S. states and Australia.

<sup>5</sup> Participating counties vary to some extent in their use of SDM assessment instruments. Most counties use most recommended assessment instruments on large percentages of cases for which particular assessments are recommended. One county uses only two SDM assessment instruments and does not use the SDM risk assessment, considered one of the most important SDM tools. Variation in the use of SDM assessment tools reflects the voluntary nature of participation in the SDM Project.

of California's SDM model. Consensus-based instruments are ones developed by committees of practitioners and experts whose validity has not been tested empirically prior to use (Gambril and Shlonsky, 2000).

## I. Study Questions and Research Design

### **Study Questions 1-6, Altman-Royston Validity Criteria**

The CFRA is intended to assist child welfare workers in making important clinical decisions about child welfare cases in SDM counties. There are two basic kinds of errors that can occur in assessing cases and in the decisions that flow from them. Risk to children can mistakenly be rated as high when in fact it is low, resulting in wasteful service provision and unwarranted intrusion in family life. The reverse can happen as well. Risk can mistakenly be rated as low when it is high, endangering the lives of children by failure to intervene. Because of the serious consequences of errors, the utmost care must be taken to insure the accuracy of the CFRA so that it can be used with confidence. It is therefore important to know whether the CFRA can meet rigorous tests of validity. In an article entitled, "*What do we mean by validating a prognostic model?*" Douglas Altman and Patrick Royston (2000) have proposed a set of questions for judging the validity of risk assessment instruments like the CFRA<sup>6</sup>.

The questions assume that the researcher is testing the validity of a model on a separate sample, a technique sometimes called cross-validation (Altman and Royston, 2000; American Educational Research Association, et. al, 1999).

- Cross validation is important in order to avoid artificially inflated estimates of model accuracy that result from testing of model accuracy using the data sample on which the model was developed.

The CFRA was developed using a year 1995 sample of 2511 cases from seven California counties that were early participants in the SDM Project (Children's Research Center, 1998a). The validity analyses done here to answer Altman and Royston's validity questions were done on a separate year 2000 sample of N = 6543 families reported and investigated for maltreating their children but who were not given child protection services after the initial investigation (these are referred to as the "Sample 1" cases). Additional analyses of CFRA validity were done using a larger year 2000 sample of N = 7685 reported, investigated families that included the N = 6543 cases from Sample 1 and an additional 1142 reported, investigated families that did receive child protection services after the initial investigation (these cases are referred to as the "Sample 2" cases). All Sample 1 and Sample 2 cases came from 5 California SDM counties (see footnote 1, p. 2) in which child welfare workers performed risk assessments using the CFRA. All cases were followed prospectively in the records of all 58 California counties to determine case outcomes. All data samples and sample subsets used to answer the Altman-Royston questions are described in detail in section III of the report, entitled Data Sources and Samples.

- The Altman-Royston questions were applied to the CFRA to judge its validity as a long-term risk assessment tool for use in assessing the likelihood of a future substantiated maltreatment report within two years of an initial, "index" maltreatment report.

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<sup>6</sup> The CFRA is a "prognostic model". Prognostic models are "...used in medicine for investigating patient outcome in relation to patient and disease characteristics (Altman and Royston, 2000)." In child welfare, we are interested in investigating client outcome (e.g. future maltreatment) in relation to client characteristics and child maltreating behavior patterns.

- It was also possible to apply the Altman-Royston questions to the CFRA as an assessment of the likelihood of maltreatment recurrence within six months of an initial substantiated maltreatment report. New Federal child welfare regulations define "child safety" as the absence of substantiated maltreatment recurrence within six months of an initial substantiated incident of maltreatment. These regulations put an implicit premium on the ability to identify families likely to maltreat their children again within six months of an initial substantiated report (U.S. Dept. of Health and Human Services, 2000).
  - Ability to identify and effectively serve such families will help California and other states to reduce and maintain their rates of maltreatment recurrence within six months of an initial maltreatment incident at or below 6.1% in order to meet Federal outcome compliance criteria.

Study questions 1-6, embodying the Altman-Royston validity criteria are presented below along with the analyses undertaken to answer them:

- 1) Are the variables that were important (in the year 1995 sample) still important (in the year 2000 sample)?

Analysis: To answer this question, 20 separate bivariate logistic regressions were performed with maltreatment recurrence within 6 months of an initial substantiated report as the dependent variable and the 20 items of the CFRA each included as single independent variables in separate logistic regressions. There were 2183 families who had received no post-investigation services included in this analysis. All had been the subjects of an initial (index) investigation with a disposition of "substantiated". Twenty additional logistic regressions were run in which the dependent variable was maltreatment (occurrence or recurrence) within two years of an initial maltreatment report. The independent variables were the 20 items of the CFRA. Families who had received no post-investigation services were included in the analysis regardless of report investigation disposition (substantiated, inconclusive, or unfounded). The number of families included was 6543.

The above analyses produced odds ratios for each CFRA item in relation to future maltreatment within six months and two years of an initial report. All relationships between CFRA scores and future maltreatment were evaluated with one-tailed statistical tests using alpha levels of .05 and .10 as statistically significant.

- 2) Is the functional form of the prognostic model correct (in the year 2000 sample)?

Analysis: Using the six-month and two-year follow-up samples described above, the form of the functional relation between future maltreatment and risk was inspected to see whether future maltreatment was a positive monotonic function<sup>7</sup> of risk (CFRA scores low-risk, moderate-risk, etc.), as it was in the CFRA development sample.

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<sup>7</sup> A positive monotonic function is one in which the quantity representing the outcome of interest (future maltreatment in this research) always increases as the quantity of the presumed cause of the outcome (risk, in this research) increases.

- 3) Are the estimated regression coefficients compatible in the (year 1995) development sample and (year 2000) validation samples?

Analysis: The following procedure was applied to the CFRA considered as a risk assessment instrument with two years case follow-up: Using the low-risk CFRA score value as a reference category (scored zero), bivariate odds ratios and their associated 95% confidence intervals were computed for the likelihood (relative to low-risk cases, scored 0) of future maltreatment among moderate-risk cases (scored 1), high-risk cases (scored 2), and very high-risk cases (scored 3). This was done for both the year 1995 CFRA development sample and the year 2000 CFRA validation sample. At each level of risk (moderate, high, and very high) for which these computations were made, the confidence interval for the odds ratio from the year 1995 CFRA development sample was compared with the corresponding odds ratio confidence interval from the year 2000 CFRA validation sample. Overlap in the confidence intervals for odds ratios at a given risk level (e.g. moderate-risk) was taken to indicate "compatibility" (i.e. lack of statistically significant difference) of model coefficients in the year 1995 and year 2000 samples. This procedure could not be strictly applied to CFRA considered as a risk assessment procedure with six months of case follow-up because of lack of information about dates of future maltreatment events occurring less than two years after an initial report. An alternate method of comparison among odds ratios was used and is explained in the results section of the report.

- 4) How well does the model fit the new data (in the year 2000 sample)?

Analysis: In the year 2000 sample, a Hosmer-Lemeshow goodness of fit test was performed in a logistic regression with future maltreatment as the dependent variable and the 20 items of the CFRA as the independent variables. This analysis was performed with the six-month and two-year follow-up samples described above, N = 2183 and N = 6543, respectively.

- 5) Is the correct ordering of the prognostic groups preserved in the (year 2000) validation sample?

Analysis: At six months and two years of follow-up, the functional relationship between future maltreatment and CFRA risk scores was checked to see whether lower risk groups had lower rates of maltreatment recurrence than higher risk groups.

- 6) Are the event rates (i.e. future maltreatment) of the prognostic groups (i.e. low, moderate, high, and very high-risk groups) significantly different (in the year 2000 sample)?

Analysis: Crosstabulations of CFRA risk score (independent variable) and future maltreatment (dependent variable) for each adjacent pair of risk categories were performed and differences in future maltreatment (event) rates were evaluated for statistical significance with the Cohen's Kappa statistic. Thus in this procedure, risk and future maltreatment were crosstabulated using only low and moderate-risk cases, then again separately using only moderate and high-risk cases, etc. This procedure was applied to the six-, and 24-month follow-up samples, N = 2183 and N = 6543, respectively.

## **Study Question 7 Regarding A Possibly Spurious Relationship Between CFRA Risk Scores And Future Maltreatment**

In addition to analyses to answer study questions 1-6, the Altman-Royston validity questions, other analyses were conducted to investigate the validity of the CFRA. In the present case it is believed that there could be environmental and individual variables extraneous to the CFRA risk score-future maltreatment relationship that are capable of influencing both CFRA risk scores and future maltreatment. It is therefore appropriate to examine the risk-maltreatment relationship while adjusting for the effects of these extraneous variables. This helps to rule out the possibility that the apparent CFRA risk-future maltreatment relationship is spurious—i.e. false. Particular variables that are available for analysis and could, theoretically, operate in this way are (1) race/ethnicity (2) county/community size, (3) initial investigation allegation disposition, (4) receipt of post-investigation services, and (5) the safety of the child as measured with the SDM Safety Assessment. Hence the following study question:

- 7) When the effects of (1) race/ethnicity, (2) county/community size, (3) initial investigation allegation disposition, (4) receipt of post-investigation services, and (5) the safety of the child are controlled statistically, does the positive monotonic relationship of CFRA scored risk to maltreatment occurrence/recurrence remain in tact?

**Analysis:** To address study question 7, binary logistic regression analysis was used to observe the relationship between risk and future adjusting statistically for the effects of variables identified above as extraneous to the risk-maltreatment relationship.

Using the six- and 24-month follow-up samples described above, future maltreatment was modeled using cases that received no post-investigation services in order to examine the risk-maltreatment relationship while controlling for extraneous variables other than service provision, but in the absence of risk-service confounding. Additional models were estimated with the six- and 24-month follow-up samples expanded to include families that had received post-investigations services. In the 6-month follow-up expanded sample there were 3209 families whose index investigations were substantiated, 2183 of whom received no post-investigation services and an additional 1026 of whom did receive post-investigation services. Among families followed for 24 months, there were 6543 that received no post investigation services and an additional 1142 families that did receive post investigation services. The six- and 24-month follow-up expanded samples were analyzed in order to examine the risk-maltreatment relationship in the presence of services as well as the other extraneous variables.

Unless otherwise noted, the independent variables included in a model had the following values: (1) race/ethnicity (i. white, ii. African American, iii. Hispanic, iv. Asian/Pacific Islander, v. Other/Unknown) (2) county/community size (i. large, Orange, Los Angeles, ii. small, Humboldt, San Luis Obispo, Sutter) (3) initial (index) investigation allegation disposition (i. unfounded, ii. inconclusive, iii. substantiated) (4) receipt of post-investigation services (i. not received, ii. received), and (5) the safety of the child according to SDM Safety Assessment (i. no safety problems found, ii. one or more safety problems found—in-home safety intervention undertaken pending completion of investigation, iii. one or more safety problems found and one or more children removed from the home pending completion of the investigation), and (6) CFRA risk score (i. low, ii. moderate, iii. high, iv. very high).

The following models were estimated to accomplish the above analysis:

Models estimated with all, or subsets of Sample 1 cases (Sample 1 excludes cases that received post-investigation services to prevent risk-service confounding):

1. **Dependent variable:** Substantiated maltreatment incident within 6 months of an initial substantiated maltreatment investigation. **Independent variables:** (a) race/ethnicity, (b) county/community size, (c) SDM Safety Assessment score, and (d) CFRA risk score. This model excludes variable (3) above (initial investigation allegation disposition) because in all cases the initial investigation disposition was substantiated. This model was estimated to provide a test of the CFRA in assessing the likelihood of maltreatment recurrence within six months of an initial substantiated referral in the absence of post-investigation services. Absence of maltreatment recurrence for six months following an initial substantiated report is the number one Federal child safety criterion. The analysis included a 2183-case subset of Sample 1 cases ( $N = 6543$ ) all of which had substantiated initial investigations and received no post investigation services.
2. **Dependent variable:** Substantiated maltreatment incident (occurrence or recurrence) within 24 months of an initial investigated maltreatment report. **Independent variables:** (a) race/ethnicity, (b) county/community size, (c) initial investigation allegation disposition, (d) SDM Safety Assessment score, and (e) CFRA risk score. This model was estimated to provide a test of the CFRA in assessing the likelihood of maltreatment recurrence within 24 months of an initial referral having any investigation disposition (unfounded, inconclusive, or substantiated) in the absence of post-investigation services. The analysis included all Sample 1 cases ( $N = 6543$ ), none of which received post-investigation services.

Models estimated using Sample 2 cases (including cases that received post-investigation services, as well as those that did not):

3. **Dependent variable:** Maltreatment recurrence within six months of an initial substantiated maltreatment incident. **Independent variables:** (a) race/ethnicity; (b) county/community size; (c) receipt of post-investigation services; (d) SDM Safety Assessment score; (e) CFRA risk score. This model excludes initial investigation allegation disposition (in all cases the initial report was substantiated). The analysis included  $N = 3209$  families with substantiated index investigations, 2183 of which received no post-investigation services and 1026 of which received post-investigation services.
4. **Dependent variable:** Substantiated maltreatment incident within 24 months of an initial investigated maltreatment report. **Independent variables:** (a) race/ethnicity; (b) county/community size; (c) initial investigation allegation disposition; (d) receipt of post-investigation services; (e) child safety; (f) CFRA risk score. The analysis included  $N = 7685$  families with any index investigation disposition (substantiated, inconclusive, unfounded), 6543 of which received no post-investigation services and 1142 of which received post-investigation services.

### **Study Question 8 Regarding Possible Interaction Of Risk And Extraneous Variables**

Another possibility requiring consideration in analyzing the validity of the CFRA is the interaction of risk, as measured by the CFRA, and one or more variables extraneous to the risk-future maltreatment relationship. An interaction is absent when the effect of an independent variable, A (e.g. CFRA scores), on a dependent variable, C (e.g. future maltreatment), is the same at different levels (i.e. values) of a second independent variable, B (e.g. race/ethnicity), a variable that is extraneous to (i.e. not part of) the risk-future maltreatment relationship (Keppel, 1991). Absence of interaction is illustrated in Diagram 1, below. In Diagram 1, as risk scores (variable A) rise, future maltreatment rates (variable C) rise as well. This happens among African Americans (dark line), who represent one value of our third variable (B), and among those who are not African Americans, and thus represent other values on variable B (i.e., white, Hispanic, or other, light line). Thus we say that the "effect" of risk on future maltreatment rates is the same among all the racial/ethnic groups—whites, Hispanics, African Americans, and others—i.e. as risk scores rise, future maltreatment rates rise.

- In the analysis of the interaction of CFRA risk scores and race/ethnicity, we hope to find that interaction is absent, as this means that as risk scores rise, future maltreatment rates rise, regardless of race/ethnicity. Thus in the absence of interaction, we are not mislabeling members of any particular racial/ethnic group as being at "very high-risk" when, in fact, risk is low, etc.

### **DIAGRAM 1—INTERACTION ABSENT**

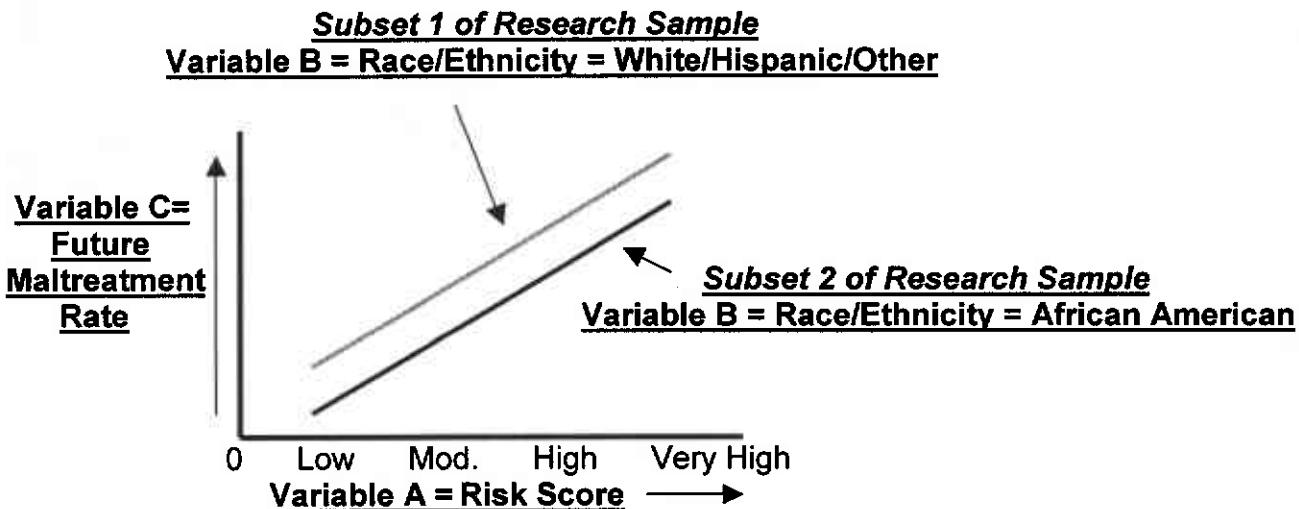
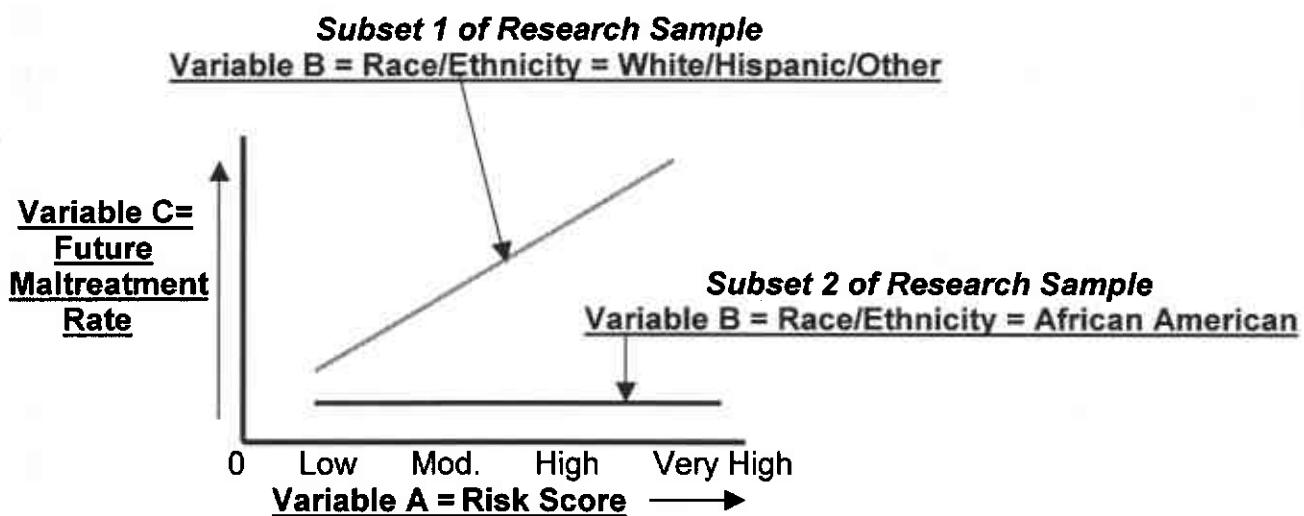


Diagram 2, below, illustrates the presence of interaction, as follows: Suppose there were a finding that CFRA scores (independent variable, A) and future maltreatment (dependent variable, C) are related as expected among whites, Hispanics, and others, taken as a single group, and with families in these groups, higher CFRA scores are associated with greater likelihood of future maltreatment. Now suppose that we find an important interaction—the relationship between risk and maltreatment that is present among whites, Hispanics, and others (i.e. as risk scores rise, future maltreatment rates rise) is different among African Americans—as risk scores increase, there is no change, up or down, in future maltreatment rates, indicating not just a different form of relationship, but an *absence* of relationship between risk and future maltreatment. The flat line in Diagram 2, indicating no increase in future maltreatment rates as risk scores increase, represents this situation for African American families.

This would mean that an African American family labeled as "very high-risk" was no more likely to maltreat its children in the future than an African American labeled "low" risk. The practical result of such mislabeling might well be unnecessary intrusion in the life of the African American family mistakenly labeled "very high-risk" and waste of limited resources in an attempt to help children in this family who don't really need help, thus taking scarce treatment resources from children in another African American family, or a family of some other race/ethnicity, whose children truly are at great risk of future maltreatment. Thus, when possible, it is extremely important to identify interaction effects that substantially modify the expected relationship between risk and future maltreatment for specific racial/ethnic subgroups.

## DIAGRAM 2—INTERACTION PRESENT



Beyond the race/ethnicity example, analysis of interactions allows us to compare the form of the relationship between risk scores and future maltreatment in one sample subset of families, with the form of this relationship observed among families in another subset of cases representing any specific values or combination of values on extraneous variables we have defined for analysis.

One particularly interesting question addressable through analysis of interactions is whether the CFRA works the same way (higher risk scores mean higher maltreatment occurrence/recurrence rates) in counties that did and did not participate in the development of the CFRA. Altman and Royston (2001) point out that the ultimate test of the validity of a prognostic device is a temporally prospective validity test in a previously unstudied locale. Though seven important California counties contributed cases to the sample used to develop the CFRA, 51 other counties did not. Two of these counties (San Luis Obispo and Sutter) have contributed cases to the present data sample. We are therefore in a position to compare the form of the risk score-future maltreatment relationship in counties that did not contribute cases to the CFRA model development sample (San Luis Obispo, Sutter) with the form of this relationship in counties that did contribute cases to the CFRA model development sample (Orange, Los Angeles, Humboldt). The applicability of the CFRA in counties other than those participating in its development is clearly of interest, and this issue will be examined through analysis of interaction effects.

Another question addressable through analysis of interaction is whether the CFRA works with families differing in their investigation outcomes (substantiated, inconclusive, unfounded). A study by the Children's Research Center (1998c) in New Mexico found that a research-based risk assessment developed for use with families whose alleged maltreatment of children was substantiated during investigation was valid also with families whose investigation outcome was inconclusive. In California's SDM project, completion of the CFRA was made a requirement in inconclusive investigations. Data are therefore available to replicate the New Mexico findings on the validity of the CFRA with inconclusive investigations.

Analysis of the interaction of CFRA scores and investigation outcome offers another opportunity as well. To the author's knowledge there have been no previous studies of the validity of a research-based risk assessment in evaluating risk of future maltreatment in families who have been investigated and were not found to have maltreated their children, resulting in an initial (index) investigation outcome of "unfounded". The present sample includes 853 families with unfounded index investigations for which the CFRA was completed. This is an important group of families. Some prominent child welfare reform initiatives (e.g. California's child welfare redesign [California Department of Social Services, 2003]) have assumed that there is at least some degree of risk to children in families with unfounded investigation outcomes but there is, as yet, no data to indicate that structured risk assessments can accurately (validly) distinguish among these families as to likelihood of future maltreatment. Interaction analysis can be used to address this question through comparisons of the form of the relationship between CFRA scores and future maltreatment rates in available samples of substantiated, inconclusive, and unfounded investigations.

Interaction analysis can play one additional role in understanding the relationship between CFRA scores and future maltreatment rates among unfounded investigations. As is noted below in describing the study sample, the sampling of unfounded investigations was uneven, with Orange and Los Angeles counties completing the CFRA on almost their entire

populations of unfounded investigations during the sampling period—81.5% for Orange and 74.8% for the Santa Fe Springs district of Los Angeles. The smaller counties—Humboldt, San Luis Obispo, and Sutter—completed the CFRA on convenience samples of their populations of unfounded investigations—11.6%, 12.3%, and 58.9% respectively, for an average of 27.6%. Analysis of interaction will reveal for unfounded investigations any differences in the form of the relationship between CFRA risk scores and future maltreatment rates and in larger counties that sampled relatively large proportions of their unfounded index investigations (Orange, Los Angeles) and smaller counties where smaller proportions of unfounded investigations were sampled (Humboldt, San Luis Obispo, Sutter). Results of this analysis will address the possibility that a sampling artifact may account for any observed positive monotonic relationship between CFRA scores and future maltreatment rates among unfounded investigations.

We see that an examination of CFRA risk score interactions with extraneous independent variables in addition to race/ethnicity is very desirable. These considerations lead us to the next research question:

- 8) Does risk interact with any of the following variables in its relationship with future maltreatment (occurrence or recurrence) within two years of an initial maltreatment report:  
(1) race/ethnicity; (2) county/community size; (3) initial investigation allegation disposition<sup>8</sup> (The foregoing variables are all from question 7, above); (4) County participation in the (year 1995) CFRA model development sample; or (5) Use of near-population data versus convenience samples to estimate the relationship between risk and future maltreatment among families with unfounded index investigations?

Analysis: To address study question 8, logistic regression analysis was used observe the relationship between risk and future maltreatment adjusting statistically for the *main* and *interaction effects* of the five variables listed above. Multiplying separate variables together forms a single variable representing the interaction of two separate variables. Before this multiplication takes place decisions must be made about how to construct each of the variables that will be party to an interaction. Variable construction is described below.

In forming the interaction variables to answer study question 8, risk was treated as a 3-valued ordinal variable with values low, moderate, and high/very high. The high and very high-risk categories were combined because the frequency of very high-risk cases was low ( $N = 138$ ) in Sample 2 (total  $N = 7685$  post-investigation service and no-service cases) necessitating combination of categories to prevent numerical problems (small or zero cells) in estimating equations (Hosmer and Lemeshow, 1989).

For similar reasons, the Asian/Pacific Islander category of the race/ethnicity variable was combined with "Other/Unknown" because there were no Asian/Pacific Islanders who

<sup>8</sup> SDM Safety Assessment scores and post-investigation service provision are the fourth and fifth extraneous variables, respectively, whose *main effects* on future maltreatment will be reported as part of the answer to question 7, above. SDM Safety Assessment and post investigation service provision should, in theory, be related to future maltreatment, and their main effects on future maltreatment will be reported in answering question 7. However, analysis indicates that their interactions with risk are important in framing an answer to the question of service effects on future maltreatment. It was noted in the introduction to this report that this topic would be dealt with in a separate report. That report will include analysis of *interaction effects* of risk, SDM Safety Assessment scores, and post-investigation service provision as these variables influence future maltreatment.

scored in the highest risk category (very high-risk), and only 18 scored in the next highest risk category (high-risk).

For purposes of forming interaction variables, the following dichotomous variables were used to represent race/ethnicity: white (scored 1) vs. all others (scored 0); African American (scored 1) vs. all others (scored 0); Hispanic (scored 1) vs. all others (scored 0); and Asian/Pacific Islander/other/unknown (scored 1) vs. all others (scored 0, including everyone other than Asian/Pacific Islander/other/unknowns).

As with race/ethnicity, zero-one dichotomies were used to represent the multi-category variable "initial (i.e. index) investigation disposition" (with values substantiated, inconclusive, unfounded), for purposes of forming interaction variables. The dichotomies representing this variable were the following: substantiated (scored 1) vs. inconclusive or unfounded (scored 0); inconclusive (scored 1) vs. substantiated or unfounded (scored 0); and unfounded (scored 1) vs. substantiated or inconclusive (scored 0).

A zero-one dichotomy was used to represent County/community size with values 0 = "large" (Los Angeles and Orange counties), and 1 = "small" (Humboldt, San Luis Obispo, and Sutter counties).

County participation in the (year 1995) CFRA model development sample was represented by a dichotomous variable scored 0 for participating counties (Los Angeles, Orange, Humboldt) and 1 for non-participating counties (San Luis Obispo, Sutter).

Variable construction to test the interaction of risk and use of convenience samples to estimate the relationship between risk and future maltreatment among families with unfounded index investigations is a complex topic. We are interested in knowing whether, as risk scores rise, future maltreatment rates rise among families whose initial (index) investigations were "unfounded". This is always the relationship we expect (and hope) to find between risk scores and future maltreatment rates.

A barrier to this knowledge is the possibility of the presence of a sampling artifact. In Orange County the CFRA was completed on ( $N = 435$ ) 81.5% of the population of unfounded index referrals. In other counties participating in the study the CFRA was completed for smaller numbers and proportions of families with unfounded index investigations (Los Angeles, [ $N = 323$ , 74.8%], Humboldt, San Luis Obispo, and Sutter [combined  $N = 95$ , average sampling fraction 27.6%]). The much smaller, non-probability "convenience samples" of families used in the latter counties could contain anomalies that, when added to data from Orange County, could produce a false appearance of the expected relationship of rising risk scores associated with higher future maltreatment rates.

Analysis of interaction was used to examine this possibility. Given the sample sizes and proportions of unfounded index investigations sampled in the various counties it was decided to form two interaction variables. One of these compares the form of the risk score-future maltreatment relationship in Orange (considered to have produced "near population data" for unfounded index investigations—81.5% were sampled) with the form of this relationship in Los Angeles, which sampled 74.8% of its population of unfounded index investigations. To make possible the formation of this first of two interaction variables a dichotomous variable was created with a score of 0 for Orange County families and 1 for Los Angeles County families. The second interaction variable defined here compares the form of the risk score-future maltreatment relationship in Orange County with the form of this relationship in Humboldt, San Luis Obispo, and Sutter counties combined, which, as noted above, sampled an average of 27.6% of their unfounded index investigations. To make possible the formation of this second interaction variable, a dichotomous variable was

created with a score of 0 for Orange County and 1 for Humboldt, San Luis Obispo, and Sutter counties.

Two-way multiplicative interactions were formed between risk (scored 0 = low, 1 = moderate, and 2 = high/very high) and the zero-one dichotomies described above representing the extraneous variables, resulting in a total of 11 interaction terms.

In composing the logistic regression equations, the main effects of risk and the extraneous variables included in a run were entered into the equations in an initial step and single interaction variables were entered in a second step. Only one interaction variable was entered in an equation at a time to avoid numerical problems (small or zero cells). As part of the effort to avoid small or zero cell sizes, only two-way interactions were considered.

Eleven models were estimated following the above logic, each containing one of the (11) interaction terms the mechanics of whose formation was described above. Each model had the following form:

Form of interaction models estimated with Sample 2 cases :

Dependent variable: Substantiated maltreatment incident within 24 months of an initial (index) investigated maltreatment report. Independent variables: (a) main effect of race/ethnicity, (b) main effect of county/community size, (c) main effect of initial investigation allegation disposition, (d) main effect of SDM Safety Assessment score, (e) main effect of receipt of post-investigation services, (f) main effect of CFRA risk score, (g) main effect of county participation in CFRA development sample [this variable was included as a main effect only in the model in which the corresponding interaction effect was tested], (h) main effect of use of a convenience sample to estimate the risk-maltreatment relationship among families with unfounded index investigations [this variable was included as a main effect only in the models in which the corresponding interaction effects were tested], and (i) a single interaction term (one of the interaction variables 1-11, described in general terms above and specified in detail in the results section of the report).

It was necessary to perform the above-described analysis of interactions using all cases ( $N = 7685$ ) and with 24-months of follow-up data. With smaller sample subsets (e.g. cases whose initial (index) referral was substantiated) and with shorter follow-up periods (e.g. the six months of follow-up prescribed for the Federal child safety outcome criterion) the numbers of future maltreatment occurrence/recurrence events available for study fell to levels jeopardizing the integrity of the analysis through the appearance of small or zero cells and accompanying numeric problems (Hosmer and Lemeshow, 1989).

**Study Question 9 Regarding The Ability Of The CFRA To Improve Child Welfare Worker Decision-making Capabilities.**

The CFRA contributes to child welfare worker decision-making capabilities by providing an estimate of the likelihood that a family/household will maltreat its children in the future. The more accurate this estimate, the more capable the child welfare worker is of making the right decision on whether to open or close a case, provide services or not, etc. In order to know that use of the CFRA improves decision-making capabilities in this sense, it is necessary to compare its accuracy with the accuracy of alternative ways of estimating the likelihood of future maltreatment that are used in current practice.

The principal alternatives to research-based assessment tools are the use of clinical judgment and the use of consensus-based assessment (Gamril and Shlonsky, 2000). A wealth of research in a variety of fields has compared the relative accuracy of clinical judgment and research based ("actuarial") assessments, generally concluding that research-based assessments are more accurate (Dawes, Faust, and Meehl, 1989). A small amount of research has compared the accuracy (validity) of consensus- versus research-based assessments in child welfare (Baird and Wagner, 2000; Baird, et. al, 1999), finding a research-based tool to be more accurate than an pair of consensus-based tools, one of which was California's Fresno State University risk assessment model, on which some state-mandated risk assessment training continues to be based. No research was found in the scholarly journals reviewed directly comparing the accuracy of clinical judgment with the accuracy of research-based assessment tools. One study, appearing in conference proceedings, found clinical predictions of future maltreatment to be unrelated to future maltreatment (Johnson, 1994)<sup>9</sup>. The scarcity of research on the relative accuracy of clinical judgment, consensus-based assessments, and research-based assessments in child welfare suggests the need for further work on the subject. Hence the following research question:

- 9) Will use of the CFRA (a research-based assessment instrument) improve the accuracy of child welfare worker assessments of future maltreatment likelihood relative to the accuracy of assessments made with clinical judgement and/or a consensus-based assessment approach?

Analysis: Procedures for use of the CFRA provide for child welfare worker "discretionary" and "policy" override (i.e. modification) of the CFRA risk assessment finding arrived at solely by scoring the CFRA (referred to here as the "scored risk"). Based on the clinical judgement of the investigating child welfare worker with supervisory concurrence, a child welfare worker may exercise a "discretionary" override to increase the risk level assessed in a case by one level (from low to moderate or, high to very high, etc.). Although the intention of SDM procedures is to limit discretionary overrides to increases of scored risk, reductions of scored risk by discretionary override are occasionally found in SDM data. "Policy" overrides occur when, based on risk assessment policies established through consensus among SDM counties, child welfare workers raise the risk level of a case from its CFRA scored risk level (low, moderate, or high) to a level of "very high-risk". This is intended to occur when any of four case characteristics is encountered in investigating a case.<sup>10</sup> The availability of cases where overrides were used allows a comparison of the accuracy of CFRA scored risk with the accuracy of the clinical- and consensus-based approaches to assessment inherent in discretionary and policy overrides. In the data sample analyzed here, overrides were exercised in 114 cases (1.5% of 7685 cases in Sample 2).

To analyze the relative accuracy of CFRA scored risk versus risk scores arrived at by override, four logistic regressions were run to model two dependent variables. One dependent variable was substantiated maltreatment within two years of the initial report. A second dependent variable was re-referral/reinvestigation within two years of the initial report.

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<sup>9</sup> This study result has been cited in the *Handbook of Child Abuse Research and Treatment* (Milner, 1998).

<sup>10</sup> The SDM policy override case circumstances are the following: (1) Sexual abuse cases in which the perpetrator is likely to have access to the child victim; (2) Cases of non-accidental injury to a child under age two (3) Cases of severe non-accidental injury; and (4) Cases in which parent/caretaker action or inaction resulted in death of a child due to abuse or neglect (previous or current).

Based on past experience, if they are accurate, both scored risk and override risk scores should be related to each of these case outcomes (Children's Research Center, 1995, 1998a).

CFRA scored risk (low, moderate, high/very high) and override risk scores (low/moderate, high, very high) were included as independent variables in separate logistic regression equations. It was necessary to combine the high and very high-risk categories of the scored risk variable as there were no cases with scored risk values of "very high-risk" among the 114 cases with overrides available for analysis. Similarly, it was necessary to combine the "low" and "moderate" risk categories of the override risk variable because there were only five cases for which application of a discretionary override resulted in a rating of "low-risk". Receipt of post-investigation services (provided, not provided) was included as a second independent variable in each logistic regression. Inclusion of a post-investigation services independent variable allowed use of all cases with overrides, whether they received post-investigation services or not, while minimizing confounding of risk scores and services in their effects on case outcomes (maltreatment or re-referral/reinvestigation within two years of initial report) through the mechanism of statistical control inherent in the mathematics of logistic regression. With the small number of cases available for analysis, it was necessary to limit the number of independent variables to two, omit consideration of interaction effects, and apply the analysis only to case outcomes at 24 months of follow-up to avoid small or zero cells and thereby prevent numerical problems in running the regressions (Hosmer and Lemeshow, 1989).

The four logistic regression equations estimated to examine the accuracy of CFRA scored risk versus override risk scores are described below:

1. **Dependent variable:** Substantiated maltreatment incident within 24 months of an initial investigated maltreatment report. **Independent variables:** (a) CFRA risk score (b) Post investigation service provision.
2. **Dependent variable:** Substantiated maltreatment incident within 24 months of an initial investigated maltreatment report. **Independent variables:** (a) override risk score (b) post investigation service provision.
3. **Dependent variable:** Re-referral/reinvestigation within 24 months of an initial investigated maltreatment report. **Independent variables:** (a) CFRA risk score (b) post investigation service provision.
4. **Dependent variable:** Re-referral/reinvestigation within 24 months of an initial investigated maltreatment report. **Independent variables:** (a) override risk score (b) post investigation service provision.

#### **Study Questions 10-12 Regarding The Validity Of The SDM Safety Assessment And Strengths And Needs Assessments.**

The CFRA is not the only SDM instrument whose validity is of interest. Among the SDM instruments for which the current sample provides some data are two consensus-based instruments—the SDM Safety Assessment and the SDM Family Strengths and Needs Assessment (FSNA). The Safety Assessment is used to decide which children may safely be left at home pending completion of an investigation of maltreatment allegations and which

children must be placed in out-of-home care to insure their safety. The FSNA is used when a decision is made to provide post-investigation services to identify the three most severe service need domains to be included in the case plan.

The SDM Safety Assessment is not usually thought of as capable of being validated against behavioral criteria (e.g. future maltreatment [recurrence or occurrence]). The time period over which some safety assessments (SDM and others) are assumed to be valid is short. In the case of the California SDM Safety Assessment, this is the period required to complete an investigation of maltreatment allegations. By regulation this is 30 days in California (State of California, 1999). Maltreatment recurrence rates over such short periods are typically extremely low and may be less than one percent.<sup>11</sup> Low variability (e.g. a recurrence rate near or below one percent) in a criterion variable substantially limits the magnitude of the relationship that may exist between any predictor variables and such a criterion variable (American Educational Research Association, et. al, 1999). Because of this problem, the SDM Safety Assessment was constructed on the basis of consensus among child welfare practitioners and experts rather than through analysis of the kind used to produce the CFRA.

The present sample does, however, offer the opportunity to test the Safety Assessment for "convergent validity" (Judd, et. al, 1991). Convergent validity is present when a measurement of a construct like safety, as represented by the SDM Safety Assessment, correlates in the expected direction with another construct, like risk of future maltreatment. For example, higher SDM Safety Assessment scores are intended to indicate greater danger to children. Higher CFRA scores are also intended to indicate greater danger. Theory would suggest, therefore, that high Safety Assessment Scores would be associated (correlated) with high CFRA scores. If such a relationship were found in the data, we could say that the Safety Assessment possessed convergent validity as measured through its correlation with the CFRA. This would constitute evidence of the validity (accuracy) of the Safety Assessment.

Like the Safety Assessment, the FSNA cannot easily be validated against behavioral criteria such as future maltreatment. According to theory, severe need—to be met through services—would only be expected to lead to future maltreatment when it is not met—i.e. when no post-investigation services are provided. Yet, child protection agencies see no utility to justify the extra work of assessing family service need in cases that will receive no post-investigation services. For this reason, SDM procedures do not require such assessments. Thus normal SDM operational procedures provide no data to use in validating the FSNA against behavioral criteria like future maltreatment and no special studies to provide such data have been undertaken. However, as is explained below in the analysis section for this study question, it is still possible to examine the convergent validity of the FSNA in relation to the CFRA and to SDM Safety Assessment scores. And it is reasonable to hypothesize, for example, that families with more severe needs would have higher CFRA scores and higher Safety Assessment scores.

The above considerations regarding the SDM Safety Assessment, the FSNA, and the CFRA lead to the following study questions regarding the possibility of convergent validity evidence supporting the SDM Safety Assessment and the FSNA:

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<sup>11</sup> In a large dataset of almost 200,000 maltreatment reports constructed by the state of Illinois and analyzed by the American Humane Association Children's Division, the incidence of maltreatment recurrence within 60 days was 1.75%.

- 10) Are SDM Safety Assessment scores positively associated with CFRA scores, providing convergent validity evidence in support of the Safety Assessment?
- 11) Is need, as measured with the FSNA, positively associated with CFRA scores, providing convergent validity evidence in support of the FSNA?
- 12) Is need, as measured with the FSNA, positively associated with SDM Safety Assessment scores, providing convergent validity evidence in support of both the FSNA and the Safety Assessment?

Analysis: To answer study questions 10-12, correlations were computed among CFRA scores, SDM Safety Assessment scores, and FSNA scores. As explained below in the section entitled "Other SDM Instruments", to study the convergent validity of the FSNA in relation to other instruments it was necessary to compute a total needs score for each family. This was done by summing the FSNA item scores for each family.

## **II. Instruments and Measures**

**The California Family Risk Assessment.** The CFRA is a 20-item instrument for use by child welfare workers. The CFRA uses information on child and caretaker characteristics collected by child welfare workers to produce an estimate of the likelihood that caretakers will maltreat their children within two years of the receipt and investigation of a maltreatment report. Using the CFRA at the conclusion of an investigation of child maltreatment allegations, the investigating child welfare worker identifies the investigated family as being at "low-risk", "moderate-risk", "high-risk", or "very high-risk" of future maltreatment within two years of report receipt. CFRA risk scores are used to decide whether to attempt to provide services to families, and if a decision to provide services is made and services are begun, to decide how many contacts should be made with the family each month. The maltreatment rates associated with the risk score categories in the year 1995 CFRA development sample were the following: low-risk (7.7% within two years of initial report), moderate-risk (13.8%), high-risk (31.8%), and very high-risk (44.3%).<sup>12</sup> This relationship between CFRA risk scores and substantiated maltreatment within two years of the initial report was statistically significant, indicating that the CFRA has the capacity to identify children reported and investigated for having been maltreated who are significantly more likely to be maltreated in the future if they do not receive effective intervention.

**Other SDM instruments.** The research also examined two other SDM instruments. These were the **SDM Safety Assessment** and the **SDM Family Strengths and Needs Assessment (FSNA)**. The SDM Safety Assessment is a consensus-based instrument used to determine whether a child may safely be left in the care of parents pending completion of an investigation, or alternatively, must be placed in foster care to insure his/her safety as the investigation is completed and longer term decisions about the necessity of intervention are made. The Safety Assessment is a checklist of 13 items used upon first contact with a reported family to identify "safety problems" (i.e. immediate threats to children) that must be addressed (Copy in Appendix I). If no safety problems are found, the child (ren) may be left with parents pending completion of an investigation. If safety problems are found but an effective safety plan not requiring out-of-home placement is feasible, it is put in place and the children remain with their parents pending investigation completion. If safety problems are found and the children cannot be made safe through implementation of a safety plan while remaining with their parents, one or more of them are placed in out-of-home care, as appropriate. Thus the following are the three possible safety decisions: (1.) no safety problems found, child (ren) may remain in the home pending investigation completion, (2.) one or more safety problems found, but in-home intervention is feasible and is provided, and (3) one or more safety problems are found and cannot be ameliorated, requiring that children be placed in foster care to insure their safety pending completion of the investigation.

The FSNA is another consensus-based instrument that is part of the California SDM model. When a decision is made to provide post-investigation services, the FSNA is used to identify the three most severe areas of need to be addressed by services from among 11 domains of child and family functioning. A four-point bipolar scale measures each domain of family functioning with "strength" represented at one end of the scale and "severe need" at the other. (Copy in Appendix I). Weights were assigned a priori to individual scale points for each item. With available data it was not possible to test the convergent validity of the FSNA,

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<sup>12</sup> Higher CFRA risk scores are also associated with higher rates of re-referral/reinvestigation, child injury, serious child injury, and placement in foster care.

as a means of selecting the three most severe needs to be addressed through services. To provide some data on convergent validity of the FSNA in this analysis, a "total need" score was computed by summing the FSNA item scores for each case and multiplying the result by -1 to reverse the numeric direction of the scale.

**Other measures.** In addition to SDM instruments used to measure risk, safety, and family strengths and needs, several case variables and demographic variables were included in the analysis. These were: (1) Investigation disposition (substantiated, inconclusive, or unfounded) recorded by the child welfare worker in the Child Welfare Services/Case Management System (CWS/CMS); (2) Race/ethnicity of primary caretaker recorded by the child welfare worker in CWS/CMS. Due to the presence of small numbers of cases in many available racial/ethnic classifications, a very large number of these classifications were combined to form four. These were white, African American, Hispanic, Asian/Pacific Islander, and other/unknown; (3) Provision of post-investigation services indicated by the opening of a new case or the continuation in open status of an existing case at the conclusion of the investigation, as recorded by the child welfare worker in CWS/CMS; (4) Out-of-home placement of one or more children was indicated by the child welfare worker in completing the SDM Safety Assessment by selection of safety decision number 3—one or more safety problems found, placement of one or more children in foster care.

### **III. Data Sources and Samples**

Three major data samples and subsets of those samples were used to answer the research questions posed in the preceding section of the report. They are described below.

**Year 1995 CFRA Development Sample.** The CFRA was developed using a sample of 2511 child welfare investigations selected at random from the records of the seven counties that were the initial participants in the SDM Project. These were Humboldt, Sacramento, Alameda, Santa Clara, Los Angeles, Orange, and San Bernardino counties. Smaller counties contributed an average of approximately 314 cases with Los Angeles contributing about twice that number. Where appropriate records were available, investigations were selected at random from among all maltreatment reports investigated during the period from January to June of 1995. The quality of records available for selection of reports varied from county to county and case selection was done during a period prior to the advent of California's statewide child welfare computer system, CWS/CMS.

**Year 2000 CFRA Validation Sample.** The validation sample consisted of 7685 cases, described in detail here, selected from five counties participating in the SDM Project. All the counties in the study were relatively early implementers of SDM that met the following criteria: (1) Their child welfare workers had to have received formal training in SDM instrument use; (2) Child welfare workers had to have begun using the CFRA on live cases in the normal course of their duties during the period January 1, 2000 and June 30, 2002; and (3) The counties had to be providing, as a minimum, CFRA risk data on some cases, along with some other SDM instrument findings (Safety Assessments, Family Strength and Needs Assessments) to the SDM Project data archive initiated and maintained by the CRC under contract with CDSS. The five counties meeting these criteria during the above defined time period were Orange, Humboldt, San Luis Obispo, Sutter, and Los Angeles (The SDM Safety Assessment, the CFRA, and the FSNA are used in Santa Fe Springs, one of five Los Angeles county administrative districts).

In the five participating counties an attempt was made to include in the study all child abuse and neglect reports received by CPS during the period January 1, 2000, to June 30, 2000 for which SDM CFRA and any other SDM assessment data were available.

For this study, case records stored in CRC's data archive were merged with corresponding case information from CWS/CMS computer files. This allowed the creation of a record for each family (i.e. reported household) containing SDM assessment information, case variables from CWS/CMS, and case outcome information that accumulated in CWS/CMS in any of California's 58 counties after receipt of child maltreatment reports. Outcome information for batches of cases was extracted periodically from CWS/CMS and added to information in pre-existing case records created in the SDM database at the time of the initial maltreatment report.

Under SDM procedures, the CFRA is to be completed for every investigation in which the allegations are substantiated or in which the investigation of the allegations is inconclusive. Thus, these are cases in which investigators believed there was child maltreatment or might have been child maltreatment. Table 1 below shows the sources of investigated, substantiated, and inconclusive reports from the five counties. The percent of the county's total substantiated or inconclusive investigations having CFRA data is shown in the right hand column of the table.

- It can be seen that the data sample represents well the population of cases recorded in CWS/CMS as having substantiated or inconclusive investigations during the first six months of 2000 in Los Angeles (Santa Fe Springs district only), Orange, Humboldt, and Sutter counties. Substantiated and inconclusive investigations are less well represented in San Luis Obispo.

**Table 1**

<b>Substantiated and Inconclusive Investigations With Valid Risk Assessments and No Receipt of Post Investigation Services (N = 5704)</b>			
<b>County</b>	<b># Of Cases</b>	<b>% Of Study Sample</b>	<b>% Of County's Substantiated Or Inconclusive Investigations 1-1-00 TO 6-30-00</b>
<b>Los Angeles***</b>	1700	29.8%	87.4%*
<b>Orange</b>	3712	65.1%	86.7%**
<b>San Luis Obispo</b>	100	1.8%	41.8%**
<b>Humboldt</b>	141	2.5%	81.6%**
<b>Sutter</b>	<u>51</u>	.9%	73.4%**
<b>Total</b>	<b>5704</b>	<b>100.0%</b>	-----

\* Estimated based on SDM Project management reports from the CRC.

\*\* Estimated from author's independent analysis of CWS/CMS data.

\*\*\* All Los Angeles data are for the Santa Fe Springs Administrative Region of Los Angeles county.

Usually the implementation of any program produces some surprises. In the case of SDM there was the unsolicited, fortuitous completion of the CFRA by child welfare workers for a sample of 853 child abuse and neglect reports that had been investigated and determined to be unfounded. This provided an unanticipated opportunity to test the validity of the CFRA with unfounded investigations. Table 2 below, shows the sources of these unfounded investigations.

**Table 2**

<b>Unfounded Investigations With Valid Risk Assessments and No Receipt of Post Investigation Services (N = 839)</b>			
<b>County</b>	<b># Of Cases</b>	<b>% Of Sample Unfounded Investigations</b>	<b>% Of County's Unfounded Investigations 1-1-00 TO 6-30-00</b>
<b>Los Angeles***</b>	323	37.9%	74.8%*
<b>Orange</b>	435	51.0%	81.5%**
<b>San Luis Obispo</b>	52	6.1%	12.3%**
<b>Humboldt</b>	10	1.2%	11.6%**
<b>Sutter</b>	<u>33</u>	3.9%	58.9%**
<b>Total</b>	<b>853</b>	<b>100.0%</b>	-----

\* Estimated based on SDM Project management reports from the CRC in combination with the author's analysis of CWS/CMS data.

\*\* Estimated from author's analysis of CWS/CMS data.

\*\*\*All Los Angeles data are for the Santa Fe Springs "Statistical Planning Area", an administrative region of the county.

- It can be seen that the unfounded cases included in the study represent well the unfounded case populations in Los Angeles (Santa Fe Springs), Orange, and Sutter counties and are less representative of unfounded case populations in Humboldt and San Luis Obispo counties. The unfounded cases in Humboldt and San Luis Obispo counties can be regarded as convenience samples of their respective unfounded case populations.

The samples described in Tables 1 and 2 were merged to produce the samples described below in Tables 3, 4A, and 4B. Table 3 shows a breakdown of **Sample 1**. These were 6543 cases (5704 substantiated or inconclusive reports and 839 unfounded reports from Tables 1 and 2) that received no services after investigation of reported allegations of child maltreatment.

**Sample For Addressing Study Questions 1-6: Altman-Royston Validity Criteria.** DePanfelis and Zuravin, (2001), make a clear case that in studying precursors of future maltreatment it is important to control for the effects of services by excluding served cases from analysis. Consistent with their arguments, Sample 1 cases receiving no post-investigation services (presented in Table 3, below) were analyzed separately from other cases that received post-investigation services. As described in the previous section of the report, using bivariate and multivariate tests these cases were analyzed to examine the accuracy of the CFRA as a tool for classifying families reported for maltreatment as to the likelihood that they would maltreat their children within two years of an initial maltreatment report. A subset of Sample 1 cases was used to analyze the likelihood of maltreatment recurrence within 6 months of an initial substantiated report. These were the N = 2183 reported, investigated families whose initial report was substantiated, but who received no post-investigation services. They are shown below in Table 3, column 1, row 6.

**TABLE 3—STUDY SAMPLE 1**

COUNTY	NO POST-INVESTIGATION SERVICES PROVIDED (N = 6543)							
	Investigation Outcome							
	Substantiated		Unfounded		Inconclusive		Sample Totals	
	1. N	2. % By County	3. N	4. % By County	5. N	6. % By County	7. N	8. % By County
1. Humboldt	36	1.6%	9	1.1%	105	3.0%	150	2.3%
2. Los Angeles	302	13.8%	322	38.4%	1398	39.7%	2022	30.9%
3. Orange	1779	81.5%	423	50.4%	1933	54.9%	4135	63.2%
4. San Luis Obispo	42	1.9%	52	6.2%	58	1.6%	152	2.3%
5. Sutter	24	1.1%	33	3.9%	27	0.8%	84	1.3%
6. Totals (% By County)	2183	100.0%	839	100.0%	3521	100.0%	6543	100.0%

**Sample For Addressing Study Questions 7 and 8: Examining The Accuracy Of The CFRA And The Simultaneous Operation Of Extraneous Variables.** An analytic limitation arises when only cases that received no post-investigation service are used to assess the accuracy of a risk assessment instrument. It is not possible to observe simultaneously the separate effects (or lack thereof) of risk and services on future maltreatment (occurrence/recurrence). To overcome this limitation, **Sample 2**, shown below in Table 4B, was constructed. This sample included the 6543 cases from **Sample 1** (Table 3) and 1142 additional cases shown in Table 4A that were served post-investigation in participating counties (Sample 2 N = 7685). Table 4B presents a breakdown of Sample 2 by investigation outcome.

As described previously, Sample 2 cases were analyzed using multivariate tests to examine the accuracy of the CFRA in identifying families likely to maltreat their children within two years of an initial report, adjusting for the effects of receipt of post investigation services and other variables. A subset of Sample 2 cases was used to analyze the likelihood of maltreatment recurrence within 6 months of an initial substantiated report adjusting for the effects of post-investigation services and other variables. These were the N = 3209 reported and investigated Sample 2 families whose initial report was substantiated, shown below in Table 4B, row 15, column 1.

**TABLE 4A**

COUNTY	Investigation Outcome							
	Substantiated		Unfounded		Inconclusive		Sample Totals	
	1. N	2. % By County	3. N	4. % By County	5. N	6. % By County	7. N	8. % By County
7. Humboldt	22	2.1%	1	5.3%	2	2.0%	25	2.2%
8. Los Angeles	107	10.4%	1	5.3%	24	23.5%	132	11.6%
9. Orange	844	82.3%	12	89.5%	74	72.5%	930	81.4%
10. San Luis Obispo	19	1.8%	0	0.0%	0	0.0%	19	1.7%
11. Sutter	34	3.3%	0	0.0%	2	2.0%	36	3.2%
<b>12. Totals(% By County)</b>	<b>1026</b>	<b>100.0%</b>	<b>14</b>	<b>100.0%</b>	<b>102</b>	<b>100.0%</b>	<b>1142</b>	<b>100.0%</b>

**TABLE 4B—SAMPLE 2**

	GRAND TOTALS—TABLES 3 AND 4A, COMBINED TO FORM SAMPLE 2							
	Substantiated		Unfounded		Inconclusive		Sample Totals	
	1. N	2. %	3. N	4. %	5. N	6. %	7. N	8. %
13. Table 3 Totals—No Post-Investigation Services Provided (% By Invest. Outcome)	2183	33.4%	839	12.8%	3521	53.8%	6543	100.0%
14. Table 4A Totals —Post-Investigation Services Provided (% By Invest. Outcome)	1026	89.8%	14	1.2%	102	8.9%	1142	100.0%
<b>15. SAMPLE 2—GRAND TOTALS TABLES 3, AND 4A(% By Invest. Outcome)</b>	<b>3209</b>	<b>41.7%</b>	<b>853</b>	<b>11.1%</b>	<b>3623</b>	<b>47.1%</b>	<b>7685</b>	<b>100.0%</b>

- Among cases that received post-investigation services as well as those that did not, the proportions of cases from the sampled counties are roughly similar. Orange County contributed the largest proportion of cases, followed by Los Angeles and the smaller counties.

**Sample For Addressing Study Question 9: Whether The CFRA Can Improve Child Welfare Worker Decision-making Capabilities.** Data for the analysis of study question 9 consisted of a convenience sample of 114 cases from among the total number of Sample 2 cases described above ( $N = 7685$ ) in which child welfare workers chose to override the scored risk findings of the CFRA using a discretionary override (based on clinical judgment) or a policy override (based on consensus among SDM counties).

**Samples For Addressing Study Questions 10-12: The Analysis Of The Convergent Validity Of The SDM Safety, And Family Strengths And Needs Assessments.**

The data samples used for assessing convergent validity of the SDM Safety Assessment and Family Strength and Needs Assessments consist of subsets of the cases for which the CFRA was completed, shown in tables 1 through 4B above. SDM Safety Assessments were available for all cases in Samples 1 and 2 above for which the CFRA was completed,  $N = 6543$  and  $N = 7685$ , respectively. Under SDM guidelines, the FSNA need not be completed unless post-investigation services are provided. In Sample 2, the FSNA was completed for 75.2% (859 of 1142) cases that received post-investigation services for which the CFRA was also available.

## **IV. STUDY RESULTS**

### **Results for Study Questions 1- 6—Whether The CFRA Meets The Altman-Royston Validity Criteria.**

- 1) Altman and Royston's first criterion is that instrument items that were important in the (year 1995) instrument development sample should be important in the (year 2000) validation sample.**

**Criterion 1) results for the CFRA considered as a risk assessment instrument with 24 mos. of follow-up on all families, regardless of initial report allegation disposition.** Table 5, on the next page, shows each of the 20 items in the CFRA, its minimum possible score, maximum possible score, and the odds ratio for the item in relation to maltreatment within 24 months of an initial investigated report.

- The data in Table 5 indicate that 85%, or 17 of 20 CFRA items (1-10, 12-14, and 16-19) are related to future maltreatment in the expected direction (higher item scores go with higher future maltreatment rates) to a statistically significant degree (i.e.  $p. \leq .05$ ).
- Under the null hypothesis of no relationship between CFRA items and future maltreatment, the expected probability of finding a statistically significant relationship in the expected direction between any single CFRA item and future maltreatment is .025. With 17 of 20 CFRA items related to future maltreatment in the expected direction, the observed probability is .85, or 34 times what we would expect if the items were unrelated to future maltreatment ( $.85/.025 = 34$ ). A reasonable conclusion is that, by and large, the same items that were important in the development of the CFRA in the year 1995 sample continue to be important in the year 2000 validation sample.

**Table 5**  
**California Family Risk Assessment (CFRA) Items in Relation**  
**to Future Maltreatment(Occurrence or Recurrence) Within 24 Mos. of**  
**an Initial Maltreatment Report(In computing odds ratios, CFRA**  
**items were treated as continuous variables.)**

<b>California Family Risk Assessment (CFRA) Items</b>	<b>Min. Score</b>	<b>Max. Score</b>	<b>Odds Ratio</b>	<b>95% Confidence Interval Boundaries For Odds Ratios</b>	
				<b>Lower</b>	<b>Upper</b>
1. Current Complaint is for Neglect	0	1	1.61*	1.39	1.86
2. Prior Investigations (assign highest score that applies)	0	3	1.56*	1.46	1.68
3. Household has Previously Received CPS (voluntary/court-order)	0	1	3.01*	2.44	3.71
4. Number of Children Involved in the CA/N Incident	0	1	1.65*	1.27	2.15
5. Age of Youngest Child in the Home	0	1	1.59*	1.33	1.89
6. Primary Caretaker Provides Physical Care Inconsistent with Child Needs	0	1	1.62*	1.05	2.50
7. Primary Caretaker has a Past or Current Mental Health Problem	0	1	2.14*	1.51	3.06
8. Primary Caretaker has Historic or Current Alcohol or Drug Problem. (Check applicable items and add for score)	0	2	2.08*	1.68	2.41
9. Characteristics of Children in Household(Check applicable items and add for score)	0	3	1.56*	1.11	2.19
10. Housing (check applicable items and add for score)	0	3	1.82*	1.32	2.50
11. Current Complaint is for Abuse	0	1	0.77	0.66	0.90
12. Number of Prior Abuse Investigations	0	2	1.58*	1.44	1.73
13. Household has Previously Received CPS (voluntary/court-ordered)	0	1	3.06*	2.48	3.79
14. Prior Injury to a Child Resulting from CA/N	0	1	2.42*	1.80	3.24
15. Primary Caretaker's Assessment of Incident (check applicable items and add for score)	0	3	1.03	0.81	1.31
16. Domestic Violence in the Household in the Past Year	0	2	1.14*	1.04	1.25
17. Primary Caretaker Characteristics (check applicable items and add for score)	0	3	1.49*	1.17	1.90
18. Primary Caretaker has a History of Abuse or Neglect as a Child	0	1	2.01*	1.53	2.64
19. Secondary Caretaker has Historic or Current Alcohol or Drug Problem	0	1	1.49*	1.19	1.87
20. Characteristics of Children in Household (check appropriate items and add for score)	0	2	1.14	0.93	1.40

\* p. < .05 \*\*p. < .10 Likelihood of future maltreatment changes, on average by an amount equal to the odds ratio for each unit increase in CFRA item score. Some items can increment by more than one score point.

**Criterion 1) results for the CFRA considered as an instrument for assessing likelihood of maltreatment within 6 mos. of an initial substantiated maltreatment report (Absence of maltreatment recurrence within six months of an initial substantiated report is the U. S. Government child safety criterion).** Table 6, on the next page, contains the data on relations of individual CFRA items to maltreatment recurrence within six months of receipt of a substantiated maltreatment report.

- Eleven of 20 CFRA Items (2-4, 6, 8, 10, 12-14, 18, and 20) are statistically significantly related to maltreatment recurrence within six months of an initial substantiated report at significance levels of  $p. < .05$ . Another 4 items (1, 5, 17, and 19) are positively related to maltreatment recurrence at  $p. < .10$ .
- Thus fifteen CFRA items (75%) are statistically significantly related to maltreatment recurrence within six months of an initial substantiated report at significance levels of  $p. < .05$  or  $p. < .10$ , using 1-tailed tests.
- A loss of statistical power due to decreased sample size (from 6543 cases to 2183) and a reduction in variability in the criterion variable (from 848 maltreatment events to 132) when testing the CFRA in this analysis of substantiated initial reports, likely accounts for the reduced number of items statistically significant at  $p. < .10$ , or  $p. < .05$  (Cohen, 1988; American Educational Research Association, et. al, 1999). Of the statistically insignificant items, three (7, 9, and 16) had positive odds ratios fairly substantially greater than 1.0 which would very likely be statistically significant in a larger sample with greater criterion variability.
- Under the null hypothesis of no relationship between CFRA items and future maltreatment, the expected probability of finding a statistically significant relationship in the expected direction between any single CFRA item and future maltreatment is .025. With 15 of 20 CFRA items related to future maltreatment in the expected direction, the observed probability is .75, or 30 times what we would expect if the items were unrelated to future maltreatment ( $.75/.025 = 30$ ). A reasonable conclusion is that, by and large, the same items that were important in the development of the CFRA in the year 1995 sample continue to be important in the year 2000 validation sample when the CFRA is used to classify cases as to likelihood of maltreatment recurrence within six months of an initial substantiated report.

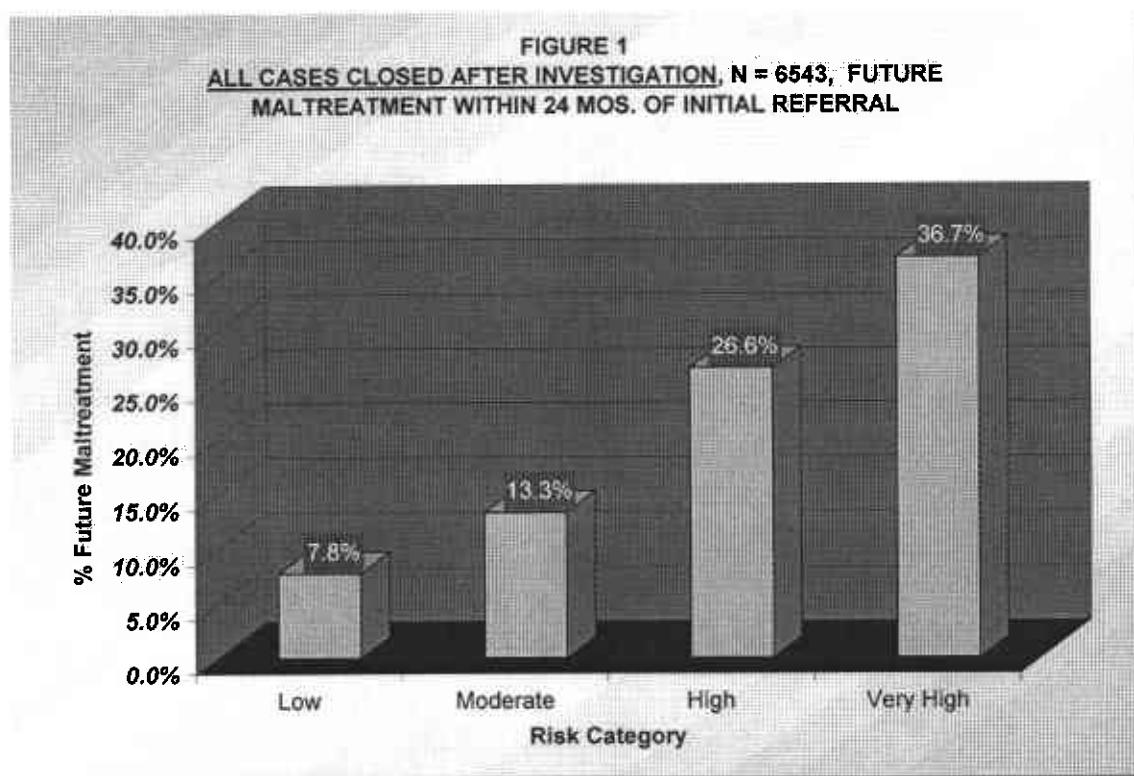
**Table 6**  
**California Family Risk Assessment (CFRA) Items in Relation to Maltreatment Recurrence Within 6 Mos. of an Initial Substantiated Maltreatment Report**  
**(In computing odds ratios, CFRA items were treated as continuous variables.)**

<b>California Family Risk Assessment (CFRA) Items</b>	<b>Min. Score</b>	<b>Max. Score</b>	<b>Odds Ratio</b>	<b>95% Confidence Interval Boundaries For Odds Ratios</b>	
				<b>Lower</b>	<b>Upper</b>
<b>1. Current Complaint is for Neglect</b>	0	1	1.39**	.98	1.98
<b>2. Prior Investigations (assign highest score that applies)</b>	0	3	1.60*	1.37	1.88
<b>3. Household has Previously Received CPS (voluntary/court-order)</b>	0	1	3.22*	1.99	5.23
<b>4. Number of Children Involved in the CA/N Incident</b>	0	1	2.42*	1.41	4.16
<b>5. Age of Youngest Child in the Home</b>	0	1	1.33**	.88	2.02
<b>6. Primary Caretaker Provides Physical Care Inconsistent with Child Needs</b>	0	1	1.97*	1.00	3.89
<b>7. Primary Caretaker has a Past or Current Mental Health Problem</b>	0	1	1.73	.73	4.09
<b>8. Primary Caretaker has Historic or Current Alcohol or Drug Problem. (Check applicable items and add for score)</b>	0	2	2.09*	1.43	3.06
<b>9. Characteristics of Children in Household (Check applicable items and add for score)</b>	0	3	1.66	.75	3.66
<b>10. Housing (check applicable items and add for score)</b>	0	3	2.28*	1.37	3.81
<b>11. Current Complaint is for Abuse</b>	0	1	.97	.63	1.50
<b>12. Number of Prior Abuse Investigations</b>	0	2	1.40*	1.11	1.75
<b>13. Household has Previously Received CPS (voluntary/court-ordered)</b>	0	1	2.71*	1.65	4.45
<b>14. Prior Injury to a Child Resulting from CA/N</b>	0	1	2.64*	1.51	4.61
<b>15. Primary Caretaker's Assessment of Incident (check applicable items and add for score)</b>	0	3	1.01	.65	1.57
<b>16. Domestic Violence in the Household in the Past Year</b>	0	2	1.10	.92	1.32
<b>17. Primary Caretaker Characteristics (check applicable items and add for score)</b>	0	3	1.54**	.99	2.38
<b>18. Primary Caretaker has a History of Abuse or Neglect as a Child</b>	0	1	2.26*	1.33	3.83
<b>19. Secondary Caretaker has Historic or Current Alcohol or Drug Problem</b>	0	1	1.39**	.90	2.15
<b>20. Characteristics of Children in Household (check appropriate items and add for score)</b>	0	2	1.91 *	1.22	3.01

\* p. < .05 \*\*p. < .10 Likelihood of future maltreatment changes, on average by an amount equal to the odds ratio for each unit increase in CFRA item score. Some items can increment by more than one score point.

- 2) The second criterion set forth by Altman and Royston is that the functional form of the prognostic model be correct (i.e. the same in the year 2000 validation sample as in the year 1995 instrument development sample).

**Criterion 2) results for the CFRA considered as a risk assessment instrument (24 mos. of follow-up on all families, regardless of initial report allegation disposition).** Figure 1, below shows the relationship between risk assessment scores assigned to families by child welfare workers and future maltreatment within two years of receipt of an initial report in Sample 1, the year 2000 validation sample subset of cases closed after investigation (N = 6543).



- In the year 1995 CFRA development sample, future maltreatment was a positive monotonic function of risk scores, i.e. as risk scores increase, associated maltreatment rates always increase. Maltreatment rates within two years of an initial report for that sample were: Low-risk, 7.7%; moderate-risk 13.8%; high-risk, 31.8%; and very high-risk, 44.3%. In the year 2000 sample, the rates are: Low-risk, 7.8%; moderate-risk 13.3%; high-risk, 26.6%; and very high-risk, 36.7%. Thus for the year 2000 validation sample, maltreatment rates within two years of an initial report are again a positive monotonic function of risk scores.

- It appears that the functional form of the model is "correct"—it is the same in the year 1995 CFRA development and year 2000 validation samples.

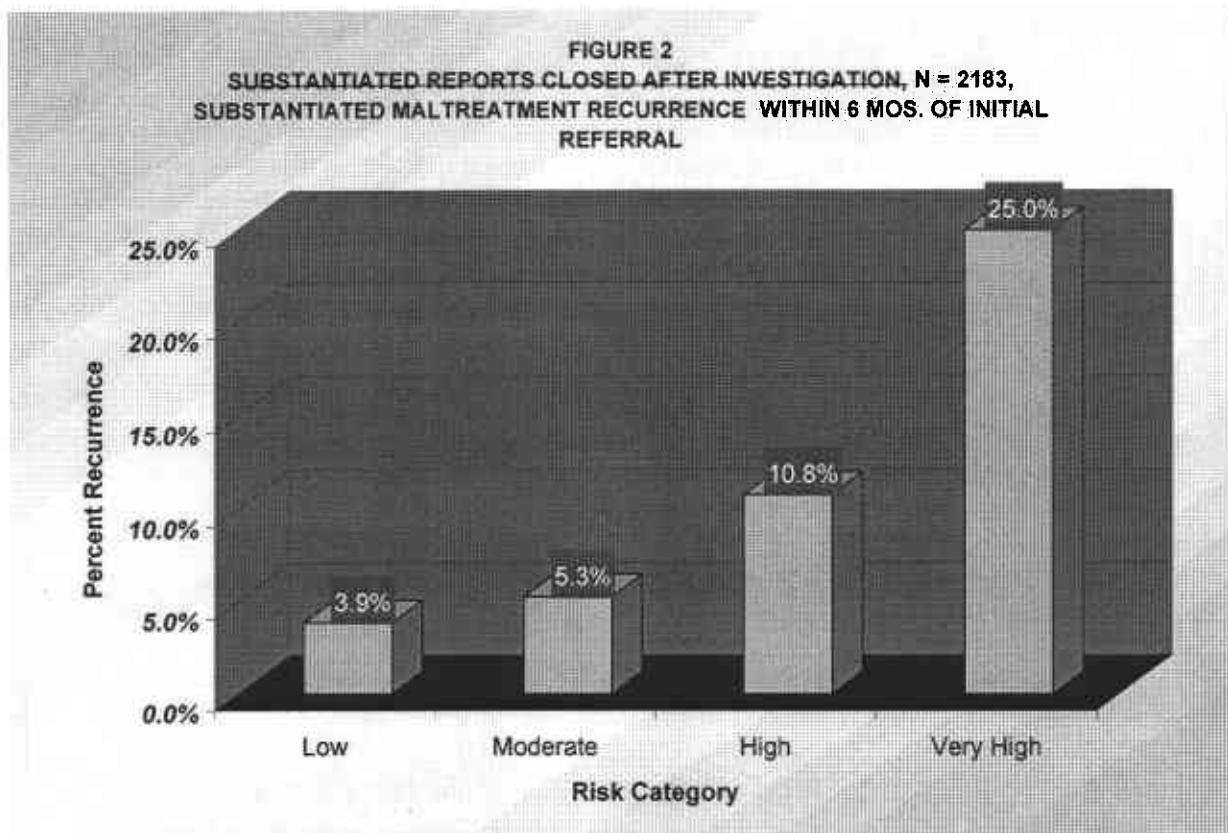
Table 7, below, shows the frequencies for the risk categories of the CFRA in Figure 1, above.

**Table 7--All Cases Included Regardless  
of Initial Investigation Outcome and Closed After Investigation**

<b>All Cases Closed After Investigation</b>	Future Maltreatment % At Each Risk Level					<b>Odds Ratio*</b>	95% Confidence Interval Boundaries	
	<b>24 Months Follow-up</b>	<b>Low Risk</b>	<b>Mod. Risk</b>	<b>High Risk</b>	<b>V. High Risk</b>		<b>Lower</b>	<b>Upper</b>
<b>Future Maltreatment %</b>	7.8%	13.3%	26.6%	36.7%	2.03	1.82	2.26	
<b>Total N =6543, Category N(%)</b>	2353(36.0%)	3430(52.4%)	711(10.9%)	49(.7%)				

\*This odds ratio is for risk in relation to future maltreatment with risk treated as a continuous variable. It represents the average increase in the likelihood of future maltreatment for an increase of one unit in risk.

**Criterion 2) results for the CFRA considered as an instrument for assessing likelihood of maltreatment within 6 mos. of an initial substantiated maltreatment report (Absence of maltreatment recurrence within six months of an initial substantiated report is the U. S. Government child safety criterion).** Figure 2, below, shows the maltreatment recurrence rates for initial maltreatment reports whose allegations were substantiated. These cases are the substantiated initial report subset ( $N = 2183$ ) of Sample 1 cases ( $N = 6543$ ) closed after investigation.



- In the year 2000 CFRA validation sample, the maltreatment recurrence rates within six months of an initial substantiated maltreatment were: Low-risk, 3.9%; moderate-risk 5.3%; high-risk, 10.8%; and very high-risk, 25.0%.
- It appears that the functional form of the model is "correct" for the CFRA when used to assess the likelihood of maltreatment recurrence within six months of an initial substantiated report. Maltreatment recurrence rates are a positive monotonic function of risk scores, as they were in the year 1995 CFRA development sample.

Table 8, below, shows the frequencies for the risk categories of the CFRA in Figure 2, above.

**Table 8—All Cases Substantiated and Closed After Initial Investigation**

<u>All Cases Closed After Investigation</u>	Maltreatment Recurrence % At Each Risk Level				Odds Ratio*	95% Confidence Interval Boundaries	
	Low Risk	Mod. Risk	High Risk	V. High Risk		Lower	Upper
<b>6 Months Follow-up</b>							
Maltreatment Recurrence %	3.9%	5.3%	10.8%	25.0%	1.95	1.50	2.52
Total N =2183, Category N(%)	492(22.5%)	1340(61.4%)	323(14.8%)	28(1.3%)			

\*This odds ratio is for risk in relation to future maltreatment with risk treated as a continuous variable. It represents the average increase in the likelihood of future maltreatment for an increase of one unit in risk.

- 3) The third of Altman and Royston's validity criteria is that estimated regression coefficients be compatible in the year 1995 development and year 2000 validation samples.

**Criterion 3) results for the CFRA considered as a risk assessment instrument (24 mos. of follow-up on all families, regardless of initial report allegation disposition).** To satisfy this criterion, odds ratios for future maltreatment as a function of risk scores (moderate, high, and very high, with low-risk as the reference category) and 95% confidence intervals for those odds ratios were computed for the year 1995 development sample and the year 2000 validation sample (Sample 1, described earlier in this report).

- The compatibility (i.e. the lack of difference) of the odds ratios for the risk levels in the original and new cross validation sample is indicated by the overlap of the 95% confidence intervals shown in the table to the right of the odds ratios.
- At each level of risk (moderate, high, very high) there is some overlap of the confidence intervals for the odds ratios, indicating a lack of statistically significant difference in odds ratios from the two samples.

Table 9

Comparison of Odds Ratios From Original Model Development Sample and New Cross Validation Sample			<u>95% Conf. Interval</u>	
Risk Level	Data Sample	Odds Ratio*	Boundaries	
Moderate	Year 1995 Sample	1.92	1.25	2.95
	Year 2000 Sample	1.81	1.51	2.17
High	Year 1995 Sample	5.57	3.66	8.47
	Year 2000 Sample	4.27	3.41	5.34
Very High	Year 1995 Sample	9.58	6.05	15.17
	Year 2000 Sample	6.84	3.76	12.47

\*Odds ratio is the likelihood of future maltreatment for cases assessed at the levels shown (moderate, high, very high) compared to low-risk cases (i.e. low-risk is the reference category).

- The data in Table 9 indicate that the model coefficients for the relationship between future maltreatment and risk are compatible for the CFRA development and validation samples.

**Criterion 3) results for the CFRA considered as an instrument for assessing likelihood of maltreatment within 6 mos. of an initial substantiated maltreatment report (Absence of maltreatment recurrence within six months of an initial substantiated report is the U. S. Government child safety criterion).** Absence of child maltreatment incident dates<sup>13</sup> in the year 1995 CFRA development sample dataset prevented its use for computation of an odds ratio for the relationship between CFRA risk scores and maltreatment recurrence within six months of an initial substantiated maltreatment report. Nevertheless, it is possible to make some comparisons bearing on the CFRA's capacity to meet Altman-Royston validity criterion 3 when used with six months of follow-up to assess risk in cases with substantiated initial reports. To provide perspective Table 9, above, was augmented with odds ratios for the CFRA risk score-maltreatment recurrence relationship for the Sample 1 subset of initial substantiated reports (N = 2183). The result appears below as Table 10.

**Table 10**  
**Comparison of Odds Ratios From Year 1995 CFRA Development Sample (N = 2511), Year 2000 Cross Validation sample (N = 6543), And Year 2000 Validation Sample, Subset Of Substantiated Initial Reports(N = 2183)**

Risk Level	Data Sample	Odds Ratio*	95% Conf. Interval Boundaries	
Moderate	1. Year 1995 CFRA Development Sample (N = 2511). Maltreatment within two years of initial report.	1.92	1.25	2.95
	2. Year 2000 Validation Sample (Sample 1 [N 6543]). Maltreatment within two years of initial report.	1.81	1.51	2.17
	3. Year 2000 Validation Sample, Subset of Substantiated Initial Reports (N = 2183). Maltreatment recurrence within 6 months of initial report.	1.39	.83	2.34
High	4. Year 1995 CFRA Development Sample (N = 2511). Maltreatment within two years of initial report.	5.57	3.66	8.47
	5. Year 2000 Validation Sample (Sample 1 [N 6543]). Maltreatment within two years of initial report.	4.27	3.41	5.34
	6. Year 2000 Validation Sample, Subset of Substantiated Initial Reports (N = 2083). Maltreatment recurrence within 6 months of initial report.	3.03	1.70	5.39
Very High	7. Year 1995 CFRA Development Sample (N = 2511). Maltreatment within two years of initial report.	9.58	6.05	15.17
	8. Year 2000 Validation Sample (Sample 1 [N 6543]). Maltreatment within two years of initial report.	6.84	3.91	13.01
	9. Year 2000 Validation Sample, Subset of Substantiated Initial Reports (N = 2183). Maltreatment recurrence within 6 months of initial report.	8.30	3.14	21.90

\*Odds ratio is the likelihood of future maltreatment for cases assessed at the levels shown (moderate, high, very high) compared to low-risk cases (i.e. low-risk is the reference category). All odds ratios are statistically significant at p. ≤ .05 except the odds ratio for moderate-risk cases whose initial report was substantiated (odds ratio = 1.39), which approached statistical significance at p. < .10 (p. = .104).

The data in Table 10 show substantial similarity in the risk-maltreatment odds ratios (i.e. overlap in confidence intervals) for odds ratios within each CFRA risk level, moderate,

<sup>13</sup> Each case in the CFRA development sample was followed for two years from the date of the initial report and it was assumed that there would be no need for computation of maltreatment rates based on shorter follow-up periods.

high, etc. This similarity is present despite the difference in follow-up periods and, thus, in criterion variability (maltreatment recurrence percentage), between samples on which the odds ratios are based. Maltreatment percentages are relatively higher for the year 1995 CFRA development sample (554/2511, 22.1%) and all cases in Sample 1 (848/6543, 13.0%), with both of these samples followed for two years. The six-month follow-up maltreatment (recurrence) rate in the substantiated initial report subset of Sample 1 is, of course, lower (132/2183, 6.0%), because of the shorter follow-up period and resulting lack of time for maltreatment to recur. Yet the overlap in confidence intervals at a given risk level in Table 10 indicates that there are no significant differences in the risk-maltreatment odds ratios for the three samples.

If the maltreatment incident dates required for examining CFRA risk scores in relation to maltreatment recurrence within six months of a substantiated initial report had been present in the year 1995 CFRA development sample, the reduction in criterion variability (maltreatment recurrence percentage) resulting from a shorter six-month follow-up period with a reduced number of maltreatment recurrences would reduce the values of the risk-maltreatment odds ratios in that sample at each risk level, i.e. low, moderate, etc. (American Educational Research Association, et. al, 1999). And any reductions in the values of these odds ratios would move them toward—rather than away from—the values of the odds ratios for the risk-maltreatment recurrence relationship with six month follow-up observed in the year 2000 CFRA validation sample subset of substantiated initial reports, because, as Table 10 shows, the latter are smaller. It is not expected that with six months of follow-up instead of two years, that the two-year follow-up odds ratios in the year 1995 CFRA development sample would decline in value and become smaller than the 6-month follow-up odds ratios in the year 2000 Sample 1 subset of substantiated initial reports. If this occurred, we would have a virtually unheard of finding—larger odds ratios for higher risk cases in the CFRA validation sample than in the sample in which the model was developed. This would be the reverse of the usual course of events.

- It is therefore reasonable to believe that if the necessary data were available in the year 1995 CFRA development sample to compare that sample with the year 2000 CFRA validation sample, no difference would be found between the model coefficients (odds ratios) in the two samples.

**4) The fourth validity criterion of Altman and Royston is that the model fit the data in the new year 2000 validation sample.**

**Criterion 4) results for the CFRA considered as a risk assessment instrument (24 mos. of follow-up on all families, regardless of initial report allegation disposition).** To see whether this criterion was met a Hosmer-Lemeshow goodness of fit test was performed in the year 2000 validation sample with future maltreatment within two years of the initial report as the dependent variable and all CFRA risk variables as the independent variables. The results are shown below in Table 11.

**Table 11**

<b>Hosmer-Lemeshow <math>\chi^2</math> Test For Goodness Of Fit In The Year 2000 Validation Sample (Sample 1, N = 6543)</b>		
<b><u>Chi-square</u></b>	<b><u>Degrees of Freedom</u></b>	<b><u>Significance</u></b>
10.83	8	.21

- Table 11 shows that the  $\chi^2$  value for the goodness of fit test was not statistically significant. Thus there is no significant lack of fit modeling maltreatment within two years of an initial report as a function of CFRA risk variables in the year 2000 CFRA validation sample.
- The CFRA considered as a risk assessment instrument meets the fourth Altman-Royston validity criterion.

**Criterion 4) results for the CFRA considered as an instrument for assessing likelihood of maltreatment within 6 mos. of an initial substantiated maltreatment report (Absence of maltreatment recurrence within six months of an initial substantiated report is the U. S. Government child safety criterion).** The Hosmer-Lemeshow goodness of fit test was performed again in the year 2000 validation sample subset of substantiated initial reports with CFRA risk variables as the independent variables and maltreatment recurrence within six months of the initial report as the dependent variable. The result is shown below in Table 12.

**Table 12**

<b>Hosmer-Lemeshow <math>\chi^2</math> Test For Goodness Of Fit In The Year 2000 Validation Sample (Sample 1) Subset of Substantiated Cases (N = 2183)</b>		
<b><u>Chi-square</u></b>	<b><u>Degrees of Freedom</u></b>	<b><u>Significance</u></b>
14.76	8	.064

- Table 12 shows that the  $\chi^2$  value for the goodness of fit test was statistically significant at  $.05 < p. < .10$ . Thus there is some lack of fit of the CFRA risk variables as a model of maltreatment recurrence within six months of a substantiated initial report in the year 2000 CFRA validation sample. In its current form the CFRA risk variables do not meet the fourth Altman Royston validity criterion as a model of maltreatment recurrence within six months of an initial substantiated report.
- Some adjustments in the item content, item score cut points or scale score category cut points might reduce the lack of fit to the point of statistical insignificance.

**5) The fifth validity criterion of Altman and Royston is that correct ordering of the prognostic groups be preserved in the year 2000 validation sample.**

**Criterion 5) results for the CFRA considered as a risk assessment instrument (24 mos. of follow-up on all families, regardless of initial report allegation disposition).** Inspection of Figure 1 (p. 39) shows that the order of future maltreatment rates for the prognostic groups (low, moderate, high, and very high-risk) is the same in the new cross validation sample as it was in the year 1995 CFRA development sample. With respect to future maltreatment, low-risk cases have the lowest rate, moderate-risk cases the next highest rate, high-risk cases the next highest rate, and very high-risk cases the highest rate.

- The CFRA considered as a risk assessment instrument meets the fifth Altman-Royston validity criterion.

**Criterion 5) results for the CFRA considered as an instrument for assessing likelihood of maltreatment within 6 mos. of an initial substantiated maltreatment report (Absence of maltreatment recurrence within six months of an initial substantiated report is the U. S. Government child safety criterion).** Inspection of Figure 2 (p. 41) shows that the order of future maltreatment rates for the prognostic groups (low, moderate, high, and very high-risk) is the same in the year 2000 validation sample of substantiated initial reports as it was in the original CFRA development sample. With respect to maltreatment recurrence within six months of a substantiated initial report, low-risk cases have the lowest rate, moderate-risk cases the next highest rate, high-risk cases the next highest rate, and very high-risk cases the highest rate.

- The CFRA used as an assessment of likelihood of maltreatment recurrence within six months of an initial substantiated report meets the fifth Altman-Royston validity criterion.

6) The sixth and final validity criterion of Altman and Royston is that event rates (future maltreatment rates)—be statistically significantly different in the prognostic groups (low, moderate, high, and very high-risk).

Criterion 6) results for the CFRA considered as a risk assessment instrument (24 mos. of follow-up on all families, regardless of initial report allegation disposition). To evaluate the CFRA on this criterion, crosstabulations of future maltreatment with risk were conducted at each pair of risk levels, comparing low with moderate-risk cases, moderate-risk with high-risk, and high-risk with very high-risk. The results are shown in Table 13, below.

**Table 13**  
**Pairwise Comparison of Event Rates For California Family Risk Assessment Risk Categories (The event is future maltreatment [occurrence or recurrence] within 24 months of initial report.)**

Risk Category Comparison	Event Rate In Lower Risk Category	Event Rate In Higher Risk Category	Kappa Value	Statistical Significance (1-tailed)
Low Vs. Moderate	7.8%	13.3%	.05	<.0005
Moderate Vs. High	13.3%	26.6%	.14	<.0005
High Vs. Very High	26.6%	36.7%	.04	<.10

- The results in Table 13 indicate that event rates differ significantly between prognostic categories (risk categories). Low-risk cases have a statistically significantly lower rate of future maltreatment than moderate-risk cases. Moderate-risk cases have a significantly lower future maltreatment rate than high-risk cases. And, finally, high-risk cases have a significantly lower future maltreatment rate than very high-risk cases.
- The CFRA considered as a risk assessment instrument with 24 months of follow-up meets Altman and Royston's sixth validity criterion.

**Criterion 6) results for the CFRA considered as an instrument for assessing likelihood of maltreatment within 6 mos. of an initial substantiated maltreatment report (Absence of maltreatment recurrence within six months of an initial substantiated report is the U. S. Government child safety criterion).** The above-described procedure was repeated to evaluate the CFRA as an assessment of likelihood of maltreatment recurrence within six months of an initial substantiated maltreatment report. Cross tabulations of maltreatment recurrence with risk were conducted at each adjacent pair of risk levels, comparing low with moderate-risk cases, moderate-risk with high-risk, etc. The results are shown in Table 14, below.

**Table 14**  
**Pairwise Comparison of Event Rates For California Family Risk Assessment Risk Categories (The event is maltreatment recurrence within Six months of initial substantiated maltreatment report.)**

Risk Category Comparison	Event Rate In Lower Risk Category	Event Rate In Higher Risk Category	Kappa Value	Statistical Significance (1-tailed)
<b>Low Vs. Moderate</b>	3.9%	5.3%	.01	=.104
<b>Moderate Vs. High</b>	5.3%	10.8%	.07	<.0005
<b>High Vs. Very High</b>	10.8%	25.0%	.12	<.05

- The results in Table 14 indicate that event rates differ significantly between the moderate, high, and very high-risk prognostic categories.
- The difference in event rates for low and moderate-risk cases is in the expected direction—lower for low-risk than for moderate-risk cases—but the difference is not quite statistically significant at  $p < .10$ , the most liberal significance criterion employed in this analysis. A little larger sample with the same size difference between the groups would likely result in a significant finding.
- In conclusion, when used to assess maltreatment recurrence risk within six months of an initial substantiated maltreatment report, the CFRA largely meets the 6<sup>th</sup> of Altman and Royston's validity criteria—that event rates must differ significantly between risk groups. In this sample, the low and moderate-risk categories are not significantly different, though the difference is in the expected direction and is very close to statistical significance at  $p < .10 = .104$ .

## Results for Study Questions 7- 12—Various Topics.

**Results For Study Question 7:** When the effects of (1) race/ethnicity, (2) county/community size, (3) initial investigation allegation disposition, (4) receipt of post-investigation services, and (5) the safety of the child are controlled statistically, does the CFRA remain accurate in classifying cases as to likelihood of future maltreatment (occurrence or recurrence)?

**Question 7 Results for the CFRA considered as a risk assessment instrument with 24 mos. of follow-up on all families, regardless of initial report allegation disposition).** Two logistic regression models were estimated to answer question 7. The first of these included only cases that had received no post-investigation services to provide a picture of the CFRA risk score-maltreatment relationship without any confounding of risk and services. The second regression was run to examine the risk-maltreatment relationship in the presence of service effects. The models are described on pages 14 and 15 (model numbers 2, and 4). Table 15, below, shows the results of the first of these logistic regressions.

**Table 15**

CFRA Risk (4-valued scale) And Other Variables In Relation To Substantiated Maltreatment Occurrence/Recurrence Within 24 Months Of Initial Referral (No post-investigation services, N = 6543.)

	Wald Statistic	Statistical Significance	Odds Ratio	95.0% Confidence Interval Boundaries For Odds Ratio	
				Lower	Upper
<b>1. Race Of Primary Caretaker (Reference category = White)</b>	10.845	.028			
a. African American	.317	.573	1.093	802	1.490
b. Hispanic	4.432	.035	.839	.712	.988
c. Asian/Pac. Islander	.754	.385	.793	.471	1.337
d. Other/Unknown	6.498	.011	.664	.485	.910
<b>2. Large County Size (Reference Category = Small)</b>	.315	.575	.918	.682	1.236
<b>3. Allegation Disposition (Reference Category = Unfounded)</b>	2.347	.309			
a. Allegation Disposition Inconclusive	1.556	.212	1.178	911	1.525
b. Allegation Disposition Substantiated	.244	.621	1.073	812	1.416
<b>5. Safety Finding (Reference Category = No Safety Problems Found)</b>	8.135	.017			
a. One Or More Safety Problems + In-Home Safety Intervention	6.305	.012	1.246	1.049	1.480
b. One Or More Safety Problems/ 1+ Children Removed	3.066	.080	2.172	912	5.177
<b>5. Risk (Reference category = Low Risk)</b>	107.730	.000			
a. Moderate Risk	23.816	.000	1.618	1.334	1.962
b. High Risk	95.706	.000	3.495	2.720	4.491
c. Very High Risk	25.917	.000	5.097	2.723	9.542
<b>Constant</b>	159.760	.000	.090		

In the analysis presented in Table 15, future maltreatment within two years of an initial report was the dependent variable. Independent variables were: (1) Race of primary caretaker (white, African Am., Hispanic, Asian/Pacific Islander, Other/unknown); (2) County/community size (large [Orange, Los Angeles]; small [Humboldt, San Luis Obispo, Sutter]); (3) Initial report allegation disposition (substantiated, inconclusive, unfounded); (4) SDM Safety decision score (no safety problems, one or more safety problems with in-home intervention, one or more safety problems/1+ children removed; and (5) CFRA risk score (low, moderate, high, very high). The data in Table 15 are the Sample 1 cases (N = 6543) that received no post-investigation services.

- The odds ratios in Table 15 show that CFRA risk scores are statistically significantly related to future maltreatment within two years of an initial report in the expected direction when adjustments are made for the main effects of the other independent variables.
- Specifically, moderate-risk cases are 1.62 times, i.e. 62%, more likely than low-risk cases to have a substantiated incident of child maltreatment within two years of the initial report than are low-risk cases (odds ratio 1.618, 95% confidence interval boundaries 1.334 to 1.962). High-risk cases are 3.5 times, i.e. 250%, more likely to have another maltreatment incident within two years (odds ratio 3.495, 95% confidence interval boundaries 2.720 to 4.491). And very high-risk cases are 5.10 times, i.e. 410%, more likely than low-risk cases to have another incident (odds ratio 5.097, 95% confidence interval boundaries 2.723 to 9.542).
- Consistent with earlier results, whites (the reference category in this analysis) do not differ from African Americans in likelihood of future maltreatment when other variables including risk are controlled statistically.
- By contrast, Hispanics were about 16% less likely than whites to have future substantiated maltreatment incidents within two years of an initial incident (odds ratio .839, 95% confidence interval boundaries .712 to .988). Families whose racial/ethnic category was "other/unknown" were about 34% less likely to have future maltreatment incidents within two years of an initial incident (odds ratio .664, 95% confidence interval boundaries .485 to .910).
- In answer to Study Question 7, the relationship of CFRA risk scores to future maltreatment does not appear to be spurious when the main effects of the other variables considered here are taken into account.

Collinearity in the above model was checked by computing variance inflation factors (VIF's) for each independent variable. The largest VIF for any variable was 4.32, indicating an absence of problematic levels of collinearity (Cohen, et. al, 2003).

The second logistic regression, presented below in Table 16, was run to examine the risk-maltreatment relationship in the presence of service effects.

**Table 16**

**CFRA Risk (4-valued scale) And Other Variables In Relation To Substantiated Maltreatment Recurrence Within 24 Months Of Initial Referral (In this analysis there were N = 6543 cases closed after the initial investigation, and N = 1142 cases opened for service after the initial investigation, for a total of N = 7685.)**

	Wald Statistic	Statistical Significance	Odds Ratio	95.0% Confidence Interval Boundaries For Odds Ratio	
				Lower	Upper
<b>1. Race Of Primary Caretaker (Reference category = White)</b>	15.836	.003			
a. African American	.053	.818	1.033	.783	1.362
b. Hispanic	9.334	.002	.795	.686	.921
c. Asian/Pac. Islander	2.785	.095	.659	.403	1.076
d. Other/Unknown	6.703	.010	.696	.529	.916
<b>2. Large County Size (Reference Category = Small)</b>	1.440	.230	.854	.661	1.105
<b>3. Allegation Disposition (Reference Catgeory = Unfounded)</b>	2.613	.271			
a. Allegation Disposition Inconclusive	1.432	.231	1.165	.907	1.497
b. Allegation Disposition Substantiated	.123	.726	1.049	.803	1.371
<b>4. Risk (Reference category = Low Risk)</b>	129.307	.000			
a. Moderate Risk	27.324	.000	1.637	1.361	1.969
b. High Risk	106.367	.000	3.331	2.650	4.187
c. Very High Risk	55.842	.000	5.110	3.331	7.838
<b>5. Post-Investigation Services (Reference category = No Post Investigation Services)</b>	7.010	.008	1.323	1.075	1.627
<b>6. Safety Finding (Reference Category = No Safety Problems Found)</b>	22.667	.000			
a. One Or More Safety Problems + In-Home Intervention	5.064	.024	1.206	1.024	1.419
b. One Or More Safety Problems/ 1+ Children Removed	8.085	.004	.591	.412	.849
<b>Constant</b>	170.083	.000	.103		

In the analysis presented in Table 16, future maltreatment within two years of an initial report was the dependent variable. Independent variables were: (1) Race of primary caretaker (white, African Am., Hispanic, Asian/Pacific Islander, Other/unknown); (2) County/community size (large [Orange, Los Angeles]; small [Humboldt, San Luis Obispo, Sutter]); (3) Initial report allegation disposition (substantiated, inconclusive, unfounded); (4) CFRA risk score (low, moderate, high, very high); (5) Post-investigation services (not provided, provided); and (6) SDM Safety Assessment score (no safety problems, one or more safety problems with in-home intervention, one or more safety problems/1+ children removed). The data in Table 16 are the Sample 2 cases ( $N = 7685$ ), including 6543 cases that received no post-investigation services and 1142 cases that did receive post-investigation services.

- As was the case in the first logistic regression, the odds ratios in Table 16 show that CFRA risk scores are statistically significantly related to future maltreatment within two years of an initial report in the expected direction when adjustments are made for the main effects of post-investigation services and the other independent variables included in the analysis.
- Specifically, moderate-risk cases are 1.64 times (64%) more likely than low-risk cases to have a substantiated incident of child maltreatment within two years of an initial report than are low-risk cases (odds ratio 1.637, 95% confidence interval boundaries 1.361 to 1.969). High-risk cases are 3.33 times (233%) more likely to have another maltreatment incident within two years (odds ratio 3.331, 95% confidence interval boundaries 2.650 to 4.187). And very high-risk cases are 5.11 times (411%) more likely than low-risk cases to have another incident (odds ratio 5.110, 95% confidence interval boundaries 3.331 to 7.838).
- As was the case in the first logistic regression, whites (the reference category in this analysis) do not differ from African Americans in likelihood of future maltreatment when other variables including risk and service provision are controlled statistically.
- Hispanics again had a statistically significantly lower likelihood of future maltreatment—20.5% lower in this logistic regression (odds ratio .795, 95% confidence interval boundaries .686 to .921). Asian/Pacific Islanders were about 34% less likely than whites to have future substantiated maltreatment incidents within two years of an initial incident (odds ratio .659, 95% confidence interval boundaries .403 to 1.076,  $p < .10 = .095$ .)
- Table 16 contains mixed findings of interest regarding the effects of service provision. For example, provision of post-investigation services, without differentiating between in-home and out-of-home services, was associated with a 32% greater likelihood of future maltreatment (odds ratio 1.323, 95% confidence interval boundaries 1.075 to 1.627). By contrast, cases in which one or more children were removed from the home during investigation were about 40% less likely to experience maltreatment within two years of the initial report (odds ratio .591, 95% confidence interval boundaries, .412 to .849).

- As noted in the introduction to this report, a separate document will address the effectiveness of services in improving child and family outcomes, which is the second objective of SDM.

As with the first logistic regression model described earlier, the possibility of collinearity in the above model was checked by computing variance inflation factors (VIF's) for each independent variable. The largest VIF for any variable was 3.85, indicating an absence of problematic levels of collinearity (Cohen, et. al, 2003).

**Question 7 Results for the CFRA considered as a risk assessment instrument with 6 mos. of follow-up on substantiated initial maltreatment reports. (Absence of maltreatment recurrence within six months of an initial substantiated report is the U. S. Government child safety criterion).** As was done in answering study question 7 for the CFRA considered as a risk assessment with 24 mos. of follow-up, to answer this question considering the CFRA as an assessment of likelihood of maltreatment recurrence with six months follow-up, two logistic regression models were estimated. The first of these included only cases that had received no post-investigation services to provide a picture of the CFRA risk score-future maltreatment recurrence relationship without any confounding of risk and services. The second regression was run to examine the risk-maltreatment recurrence relationship in the presence of service effects. The models are described on pages 14 and 15 (model numbers 1 and 3). Table 17, on the next page, shows the results of the first of these logistic regressions.

In the analysis presented in Table 17, future maltreatment within six months of an initial substantiated report was the dependent variable. Independent variables were: (1) Race of primary caretaker (white, African Am., Hispanic, Asian/Pacific Islander, and Other/unknown); (2) County/community size (large [Orange, Los Angeles]; small [Humboldt, San Luis Obispo, Sutter]); (3) SDM Safety Assessment score (no safety problems, one or more safety problems with in-home intervention, one or more safety problems/1+ children removed); and (4) CFRA risk score (low, moderate, high, very high). The data analyzed in Table 17 are the Sample 1 subset of cases with substantiated initial reports that received no post-investigation services (N = 2183).

- The odds ratios in Table 17 show that high and very high-risk cases are statistically significantly more likely to have maltreatment recurrences within six months of an initial substantiated maltreatment report when adjustments are made for the main effects of the other independent variables.
- High-risk cases are 2.65 times, i.e. 165%, more likely to have another maltreatment incident within six months of an initial substantiated report (odds ratio 2.651, 95% confidence interval boundaries, 1.433 to 4.905). And very high-risk cases are 6.0 times, i.e. 500%, more likely than low-risk cases to have another incident (odds ratio 5.997, 95% confidence interval boundaries 2.120 to 16.964).

**Table 17**

**CFRA Risk And Other Variables In Relation To Substantiated Maltreatment Recurrence  
 Within 6 Months Of Initial Referral (In this analysis there were N = 2183 cases whose initial maltreatment reports were substantiated. All cases were closed after the initial investigation.)**

	Wald Statistic	Statistical Significance	Odds Ratio	95.0% Confidence Interval Boundaries For Odds Ratio	
				Lower	Upper
<b>1. Race Of Primary Caretaker (Reference category = White)</b>	2.243	.691			
a. African American	1.001	.317	1.529	.666	3.513
b. Hispanic	.159	.690	1.082	.735	1.592
c. Asian/Pac. Islander	.607	.436	.563	.133	2.387
d. Other/Unknown	.264	.607	.807	.357	1.825
<b>2. Large County Size (Reference Category = Small)</b>	2.769	.096	2.785	.833	9.306
<b>3. Safety Finding (Reference Category = No Safety Problems Found)</b>	4.360	.113			
a. One Or More Safety Problems + In-Home Safety Intervention	1.656	.198	1.336	.859	2.076
b. One Or More Safety Problems/ 1+ Children Removed	3.803	.051	3.685	.993	13.669
<b>4. Risk (Reference category = Low Risk)</b>	21.454	.000			
a. Moderate Risk	.764	.382	1.271	.743	2.175
b. High Risk	9.639	.002	2.651	1.433	4.905
c. Very High Risk	11.398	.001	5.997	2.120	16.964
<b>Constant</b>	42.844	.000	.013		

- The confidence interval boundaries for moderate-risk cases indicate that they are not significantly different than low-risk cases in likelihood of maltreatment recurrence within six months of an initial substantiated maltreatment report. This may be a result of use of a smaller sample size (N = 2183) in this analysis. The direction of the relationship is as expected (odds ratio > 1.0 = 1.27). In an analysis below with similar cases (served cases followed for six months, added to the un-served ones in the present analysis, and thus a larger sample, N = 3209), moderate-risk cases were significantly more likely ( $p. < .10 = .075$ , one-tailed) than low-risk cases to have maltreatment recurrences within six months of an initial substantiated report.

- In this analysis, there are no significant differences among racial/ethnic groups as to likelihood of maltreatment recurrence within six months of an initial substantiated report.

As with previous logistic regression models, the possibility of collinearity in the above model was checked by computing variance inflation factors (VIF's) for each independent variable. The largest VIF for any variable was 4.32, indicating an absence of problematic levels of collinearity (Cohen, et. al, 2003).

To examine the relationship between CFRA risk scores and maltreatment recurrence within six months of an initial substantiated referral in the presence of services and the other extraneous variables, another logistic regression model was estimated. This analysis included the subset of Sample 1 cases with substantiated initial maltreatment reports ( $N = 2183$ ) that received no post-investigation services, plus the subset of Sample 2 cases with substantiated initial reports in which services were provided post investigation ( $N = 1026$ ). The number of cases in the analysis is therefore 3209.

In this analysis, future maltreatment within six months of an initial substantiated report was the dependent variable. Independent variables were: (1) Race of primary caretaker (white, African Am., Hispanic, Asian/Pacific Islander, and Other/unknown); (2) County/community size (large [Orange, Los Angeles]; small [Humboldt, San Luis Obispo, Sutter]); (3) CFRA risk score (low, moderate, high, very high); (4) Post-investigation services (not provided, provided); and (5) SDM Safety Assessment score (no safety problems, one or more safety problems with in-home intervention, one or more safety problems/1+ children removed). The results are presented in Table 18 on the next page.

- As was the case in the first logistic regression, using the CFRA as an assessment of likelihood of maltreatment recurrence within six months of an initial substantiated report produced positive results when adjustments were made for the effects of extraneous variables. The odds ratio for moderate-risk cases in Table 18 (1.451) shows that using a one-tailed test with a significance criterion of .10 (two-tailed probability divided by 2 =  $.132/2 = .066$ ), moderate-risk cases are significantly more likely to have maltreatment recurrences than are low-risk cases when extraneous variables are controlled. Similarly, using a significance criterion of  $p. < .05$ , high and very high-risk cases are significantly more likely than low-risk cases to have maltreatment recurrences when extraneous variables are controlled.
- Specifically, moderate-risk cases are 1.45 times (45%) more likely than low-risk cases to have a substantiated incident of child maltreatment within six months of a substantiated initial report (odds ratio 1.451, 95% confidence interval boundaries .894 to 2.355). High-risk cases are 3.08 times (208%) more likely than low-risk cases to have another maltreatment incident within two years (odds ratio 3.077, 95% confidence interval boundaries 1.827 to 5.182). And very high-risk cases are 4.23 times (323%) more likely than low-risk cases to have another incident (odds ratio 4.23, 95% confidence interval boundaries 2.047 to 8.729).
- In this analysis, there are no significant differences among racial/ethnic groups as to likelihood of maltreatment recurrence within six months of an initial substantiated report.

**Table 18**

**CFRA Risk And Other Variables In Relation To Substantiated Maltreatment Recurrence Within 6 Months Of Initial Referral (In this analysis there were N =3209 cases whose initial maltreatment reports were substantiated. 1026 of these received post-investigation services, the remainder did not.)**

	Wald Statistic	Statistical Significance	Odds Ratio	95.0% Confidence Interval Boundaries For Odds Ratio	
				Lower	Upper
<b>1. Race Of Primary Caretaker (Reference category = White)</b>	1.372	.849			
a. African American	.202	.653	1.152	.621	2.138
b. Hispanic	.114	.735	.950	.705	1.279
c. Asian/Pac. Islander	.812	.368	.622	.222	1.745
d. Other/Unknown	.248	.619	.866	.490	1.528
<b>2. Large County Size (Reference Category = Small)</b>	.528	.467	1.250	.685	2.284
<b>3. Risk (Reference category = Low Risk)</b>	33.927	.000			
a. Moderate Risk	2.272	.132	1.451	.894	2.355
b. High Risk	17.852	.000	3.077	1.827	5.182
c. Very High Risk	15.176	.000	4.227	2.047	8.729
<b>4. Post-Investigation Services (Reference category = No Post Investigation Services)</b>	5.528	.019	1.464	1.066	2.012
<b>5. Safety Finding (Reference Category = No Safety Problems Found)</b>	6.590	.037			
a. One Or More Safety Problems + In-Home Safety Intervention	.316	.574	1.115	.763	1.629
b. One Or More Safety Problems/ 1+ Children Removed	2.647	.104	.619	.348	1.103
<b>Constant</b>	80.600	.000	.031		

- Receipt of post-investigation services was associated with a 46% increased likelihood of substantiated maltreatment within six months of an initial substantiated report (odds ratio 1.464, 95% confidence interval boundaries 1.066 to 2.012, p. < .05 = .019).
- As noted in the introduction to this report, another separate document will address the effectiveness of services in improving child and family outcomes, which is the second objective of SDM.

As with previous logistic regression models, the possibility of collinearity in the above model was checked by computing variance inflation factors (VIF's) for each independent

variable. The largest VIF for any variable was 3.34, indicating an absence of problematic levels of collinearity (Cohen, et. al, 2003).

**Results For Study Question 8: Does risk interact with any of the variables (1) race/ethnicity, (2) county/community size, (3) initial investigation allegation disposition (from question 7, above), (4) county participation in the CFRA development sample, or (5) Use of near-population data versus convenience samples to estimate the relationship between risk and future maltreatment among families with unfounded index investigations?<sup>14</sup>**

The purpose of the analysis of interactions of risk with extraneous variables is to determine whether future maltreatment is a positive monotonic function of risk (rising risk scores mean rising rates of future maltreatment) at each level or stratum of the extraneous variables. To answer this question, logistic regression equations were estimated for all cases in Sample 2 (N = 7685) with two years of follow-up.

In this modeling process there were two sets of independent variables representing main effects and interactions, respectively. Variables, representing main effects (denoted 1<sup>m</sup>, 2<sup>m</sup>, 3<sup>m</sup>, etc.) were the following: (1<sup>m</sup>) Race/ethnicity of primary caretaker (white, African Am., Hispanic, Asian/Pacific Islander/Other/unknown); (2<sup>m</sup>) County/community size (large [Orange, Los Angeles]; small [Humboldt, San Luis Obispo, Sutter]); (3<sup>m</sup>) Initial report allegation disposition (substantiated, inconclusive, unfounded); (4<sup>m</sup>) SDM Safety Assessment scores (no safety problems; one or more safety problems plus in-home safety intervention; one or more safety problems present and one or more children placed in out-of-home care); (5<sup>m</sup>) County participation in the CFRA development sample (family is/is not from participating county)—included as a main effect only in the model that tested the interaction of this variable with risk, (6<sup>m</sup>) Use of near-population data versus convenience samples to estimate the relationship between risk and future maltreatment among families with unfounded index investigations (family is/is not from convenience sample counties). Variable 6<sup>m</sup> had two operational definitions (the effect of Los Angeles County (a large convenience sample) compared to Orange county (representing near-population data), and the effect of Humboldt, San Luis Obispo, and Sutter counties combined (a smaller convenience sample), compared to Orange County (representing near-population data)). These variables were included as main effects only in the models that tested their interactions with risk, and, finally, (7<sup>m</sup>) CFRA risk score, included in all models, (low, moderate, high/very high).

The second set of independent variables were interactions (denoted 1<sup>i</sup>, 2<sup>i</sup>, 3<sup>i</sup>, etc.) of risk score (low, moderate, and high/very high) with independent variables 1<sup>m</sup>-3<sup>m</sup>, 5<sup>m</sup>, and 6<sup>m</sup>,

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<sup>14</sup> SDM Safety Assessment scores and post-investigation service provision are the fourth and fifth extraneous variables, respectively, whose *main effects* on future maltreatment will be reported as part of the answer to question 7, above. Analysis indicates that their interactions with risk are important in framing an answer to the question of service effects on future maltreatment. It was noted in the introduction to this report that this topic would be dealt with in a separate report. That report will include analysis of *interaction effects* of risk, SDM Safety Assessment scores, and post-investigation service provision as these variables influence future maltreatment.

above.<sup>15</sup> The interaction variables were the following: Risk x race/ethnicity interactions: (1<sup>i</sup>) risk x African American; (2<sup>i</sup>) risk x white; (3<sup>i</sup>) risk x Hispanic; (4<sup>i</sup>) risk x other/unknown; Risk x investigation disposition interactions: (5<sup>i</sup>) risk x substantiated; (6<sup>i</sup>) risk x inconclusive; (7<sup>i</sup>) risk x unfounded; Risk x county/community size interaction: (8<sup>i</sup>) risk x small county/community; Risk x CFRA development sample participation interaction: (9<sup>i</sup>) risk x non-participating county; and, finally, Risk x Convenience sample membership for families with unfounded index investigations: (10<sup>i</sup>) risk x large convenience sample membership (Los Angeles); (11<sup>i</sup>) risk x small convenience sample membership (Humboldt, San Luis Obispo, Sutter combined).

As noted earlier, each model whose interaction effects are recorded in Table 19 was estimated using a two-step process. In the first step, variables representing main effects were entered as a group into the logistic regression equation. In the second step of each run, one of the interaction variables (1<sup>i</sup>)-(11<sup>i</sup>), above, was added to the equation already containing main effects. In each equation, the addition of an interaction term in the second estimation step was evaluated with the likelihood ratio test statistic (G), which follows a X<sup>2</sup> distribution (Hosmer and Lemeshow, 1989).

The results of the tests of the individual interaction terms 1<sup>i</sup>-11<sup>i</sup> appear in Table 19, beginning on the next page, and the complete results (including main and interaction effects) for the eleven logistic regression models estimated to produce Table 19 appear in Tables 1-11 in Appendix II of the report.

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<sup>15</sup> Note: The values of variable 4<sup>m</sup>, SDM Safety Assessment scores, include assessment conclusions [e.g. "no safety problems"] and assessment conclusions tied to service interventions [e.g. "one or more safety problems plus in-home safety intervention"]. As noted elsewhere in the study, service interventions and their effectiveness are too large and complex a subject to be addressed in a study focusing on the validity of a risk assessment. For this reason, no interaction term for CFRA risk score x SDM Safety Assessment score was formed or analyzed here.)

**Table 19—Interaction Effects In 11 Models (For models 1<sup>1</sup> – 9<sup>1</sup>, N = 7685.  
For model 10<sup>1</sup>, N = 758. For model 11<sup>1</sup>, N = 530.)**

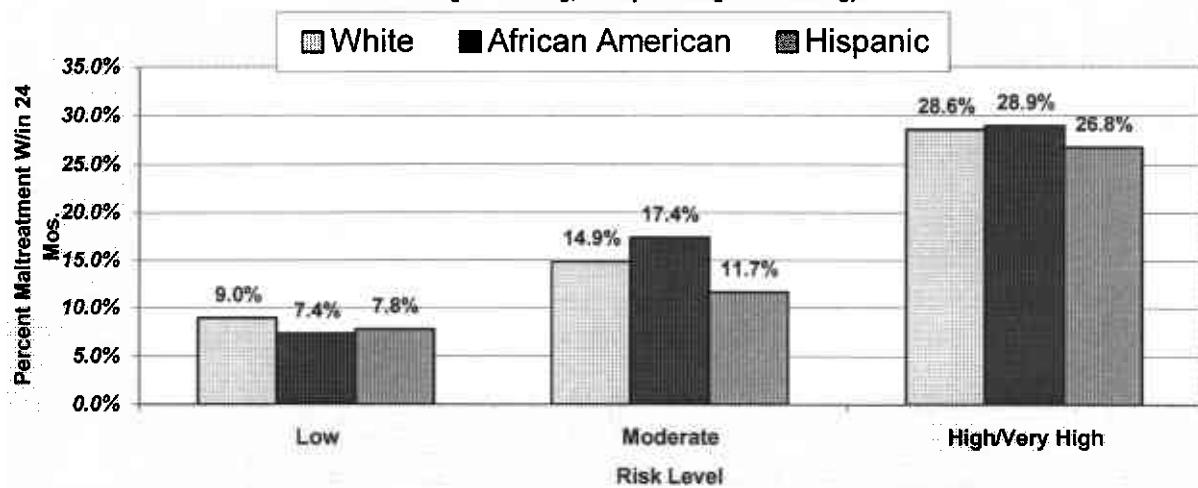
<b>Main Effects Included in models: race/eth., county size, investigation disposition, safety score, risk score, post investigation services, placement begun during investigation, county participation in CFRA dev. sample (9<sup>th</sup> model only), membership in convenience sample of unfounded index investigations (10<sup>th</sup> model only).</b>	<b>X<sup>2</sup> For Likelihood Ratio Test (G)</b>	<b>Statistical Significance</b>	<b>95% Confidence Interval Boundaries</b>		
			<b>Odds Ratio</b>	<b>Lower</b>	<b>Upper</b>
<b><u>Risk x Race/ethnicity Interactions:</u></b>					
<b>1<sup>1</sup> Risk x African American (versus others)</b> (Reference category = Non-African American, And/Or Low-Risk)	1.16	.56			
a. African Amer., Moderate-Risk			1.29	.65	2.56
b. African Amer., High/Very High-Risk			.94	.43	2.07
<b>2<sup>1</sup> Risk x White (versus others)</b> (Reference category = Non-White, And/Or Low-risk)	0.45	.80			
a. White, Moderate-Risk			1.12	.78	1.62
b. White, High/Very High-Risk			1.05	.70	1.58
<b>3<sup>1</sup> Risk x Hispanic (versus others)</b> (Reference category = Non-Hispanic, And/Or Low-Risk)	3.83	.15			
a. Hispanic, Moderate-Risk			.73	.51	1.03
b. Hispanic, High/Very High-Risk			.90	.60	1.33
<b>4<sup>1</sup> Risk x Other/Unknown (versus others)</b> (Reference category = Other/Unknown, And/Or Low-Risk)	1.95	.38			
a. Other/Unknown, Moderate-Risk			1.51	0.83	2.74
b. Other/Unknown, High/Very High-Risk			1.26	0.61	2.63
<b><u>Risk x Investigation Disposition Interactions:</u></b>					
<b>5<sup>1</sup> Risk x Inconclusive (versus other dispo.)</b> (Reference category = Inconclusive, And/Or Low-Risk)	1.83	.40			
a. Inconclusive, Moderate-Risk			0.79	0.55	1.13
b. Inconclusive, High/Very High-Risk			0.78	0.51	1.20
<b>6<sup>1</sup> Risk x Substantiated (versus other dispo.)</b> (Reference category = Substantiated, And/Or Low-Risk)	.79	.67			
a. Substantiated, Moderate-Risk			1.00	0.68	1.47
b. Substantiated, High/Very High-Risk			0.86	0.56	1.34
<b>7<sup>1</sup> Risk x Unfounded (versus other dispo.)</b> (Reference category = Unfounded, And/Or Low-Risk)	9.46	.01			
a. Unfounded, Moderate-Risk			1.57	0.89	2.78
b. Unfounded, High/Very High-Risk			3.10	1.50	6.39

**Table 19 (Con.)— Interaction Effects In 11 Models (For models 1–9<sup>1</sup>, N = 7685.  
For model 10<sup>1</sup>, N = 758. For model 11<sup>1</sup>, N = 530.)**

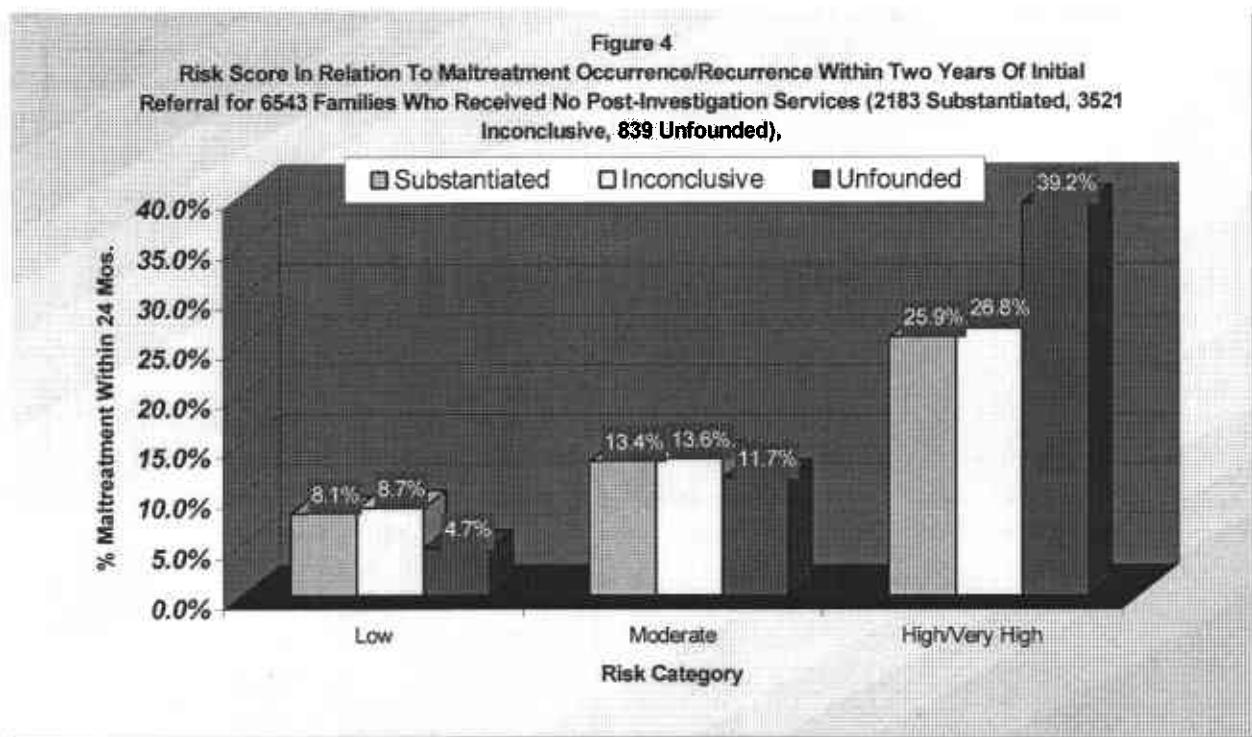
<b>Main Effects Included in models:</b> race/eth., county size, investigation disposition, safety score, risk score, post investigation services, placement begun during investigation, county participation in CFRA dev. sample (9 <sup>th</sup> model only), membership in convenience sample of unfounded index investigations (10 <sup>th</sup> model only) .				95% Confidence Interval Boundaries	
	X <sup>2</sup> For Likelihood Ratio Test (G)	Statistical Significance	Odds Ratio	Lower	Upper
<b>Risk x County Size Interaction:</b>					
8 <sup>1</sup> Risk x Small County (versus large county) (Reference category = Large County, And/Or Low-Risk)	5.74	.06			
a. Small County, Moderate-Risk			3.45	.81	14.64
b. Small County, High/Very High-Risk			4.25	1.00	18.10
<b>Risk x CFRA development sample participation interaction:</b>					
9 <sup>1</sup> Risk x non-participating county. (Reference category = Cases from counties participating in CFRA development sample And/Or Low-Risk)	2.15	.34			
a. Non-participating County, Moderate-Risk			2.13	.48	9.52
b. Non-participating County, High/Very High Risk			2.63	.59	11.68
<b>Risk x membership in convenience sample of unfounded index investigations:</b>					
10 <sup>1</sup> Risk x Los Angeles (large convenience sample, 74.8% of unfounded index investigations sampled) (Reference category = Orange County, 81.5% of unfounded index investigations sampled—near-population data And/Or Low-Risk.)	.17	.92			
a. Los Angeles County convenience sample of unfounded index investigations, Moderate-Risk			1.19	.36	4.02
b. Los Angeles County convenience sample of unfounded index investigations, High/Very High-Risk			.85	.13	5.75
11 <sup>1</sup> Risk x Humboldt, San Luis Obispo, Sutter counties (small convenience sample, 27.6% of unfounded index investigations sampled) (Reference category = Orange County, 81.5% of unfounded index investigations sampled—near-population data And/Or Low-Risk.)	.10	.95			
a. Humboldt/San Luis Obispo/Sutter County convenience sample of unfounded index investigations, Moderate-Risk			.74	.12	4.68
b. Humboldt/San Luis Obispo/Sutter County convenience sample of unfounded index investigations, High/Very High-Risk			.78	.10	6.09

**Results for Risk x Race/ethnicity Interactions:** Likelihood ratio statistics and their significance levels in rows 1-4 of Table 19 indicate that when added to main effects models in a second estimation step, none of the risk x race/ethnicity interaction terms produced significant increases in predictive power beyond that achievable with main effects alone. The absence of significant interaction effects permits unqualified interpretation of the findings for main effects. Thus we can say that across CFRA risk scale values low, moderate, and high/very high (combined), the main effect of risk produces a positive monotonic relationship between CFRA risk scores and future maltreatment—higher risk scores being associated with higher rates of future maltreatment. The statistics in table 19 indicate that this is the case regardless of membership in the largest U. S. racial/ethnic sub-populations—African American, white, and Hispanic. This is illustrated in Figure 3 below.

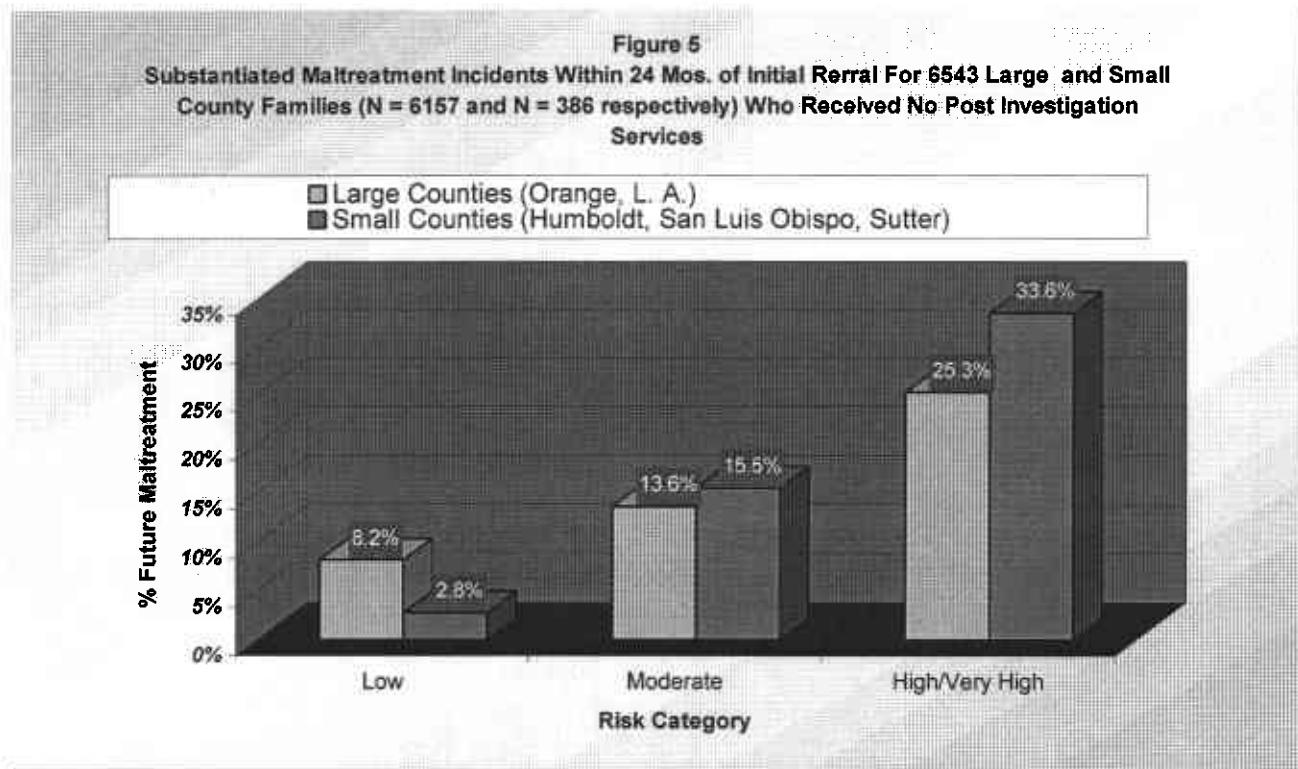
**FIGURE 3**  
**Maltreatment Occurrence/Recurrence Within 24 Mos. Of Initial Referral**  
**for 6543 Families at Low, Moderate, and High/Very High Risk Who**  
**Received No Service After Investigation. (White [N = 2427], African**  
**Amer. [N = 381], Hispanic [N = 3021]).**



**Risk x Investigation Disposition Interactions:** Likelihood ratio and Wald statistics and their significance levels in rows 5-7b of Table 19 indicate that when added to main-effects models in a second estimation step, one of the risk x investigation disposition interaction terms produced a significant increase in explanatory power beyond that achievable with main effects alone. However, the form of this interaction effect is consistent with the positive monotonic relationship of risk to future maltreatment observable across CFRA risk scale values low, moderate, and high/very high. This is illustrated in Figure 4, below. Thus, as CFRA risk scores rise, future maltreatment rates rise, regardless of investigation disposition.

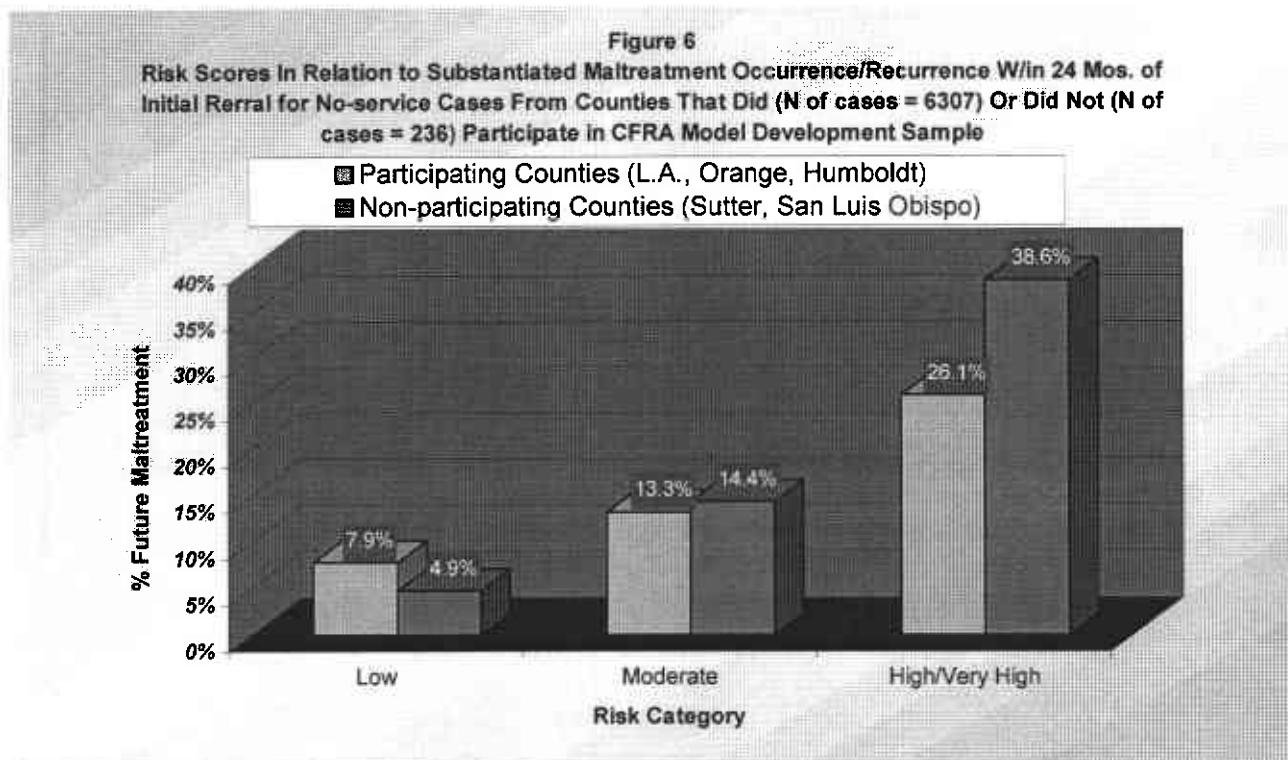


**Risk x County Size Interaction:** Likelihood ratio and Wald statistics and significance levels in rows 8-8b of Table 19 indicate that when added to main-effects models in a second estimation step, the risk x county size interaction term produced a significant increase [ $p(G) < .10$ ] in explanatory power beyond that achievable with main effects alone. However, as was the case with risk x investigation disposition interaction, the form of this interaction effect is consistent with the positive monotonic relationship of risk to future maltreatment observable across CFRA risk scale values. This is illustrated in Figure 5, below. As CFRA risk scores rise, future maltreatment rates rise, regardless of county size, large or small.



**Risk X CFRA Development Sample Participation Interaction:** This is among the most important interaction effects assessed in the analysis. The ultimate test of a prognostic tool like the CFRA is its validity in completely new environments, none of whose case populations were sampled for use in model development (Altman and Royston, 2001). The results of this test give evidence about the form of the relationship between CFRA risk scores and future maltreatment incidents in counties that contributed no cases to the model development sample (Sutter, San Luis Obispo) compared to counties that did (Orange, L.A., Humboldt).

Likelihood ratio statistics and significance levels in rows 9-9b of Table 19 indicate that when added to the main effects model in a second estimation step, the risk x development sample participation interaction term produced no significant increase in explanatory power beyond that achievable with main effects alone. Thus, across CFRA risk scale values low, moderate, and high/very high, future maltreatment rates are a positive monotonic function of CFRA risk scores, regardless of development sample participation/non-participation, as can be seen below in Figure 6.



**Risk X CFRA Convenience Sample Interaction:** Likelihood ratio statistics and significance levels in rows 10<sup>t</sup> and 11<sup>t</sup> of Table 19 indicate that when added to main effects models in a second estimation step, the risk x convenience sample interaction terms produced no significant increase in explanatory power beyond that achievable with main effects alone.

- Thus, for families with unfounded index investigations, future maltreatment rates are a positive monotonic function of CFRA risk scores—as risk scores rise, future maltreatment rates rise—regardless of the use of small, non-probability samples in some counties.
- Due to this risk-future maltreatment relationship among families with unfounded index investigations, the CFRA possesses the ability to identify a relatively small fraction—24.7% are high or very high-risk in this sample—who have a much greater likelihood of future maltreatment. In the absence of effective services, these families have a 39.2% maltreatment rate within 24 months of referral. Among low and moderate-risk families with unfounded index investigations, the maltreatment rate is 7.7% within 24 months.

These are important findings. Many current child welfare reform initiatives—including so called "alternative response" systems—assume that there is some risk to children and that families should receive some services even when alleged child maltreatment is found not to have occurred when investigated (See, for example, State of California, 2003).

However, any attempt to help *all* families whose investigation result is "unfounded" might collide immediately with the resource constraints that motivated the development of early risk assessment systems in the 1980s (Johnson and L'Esperance, 1984; Children's Research Center, 1986). These same resource constraints operate today through tight state budgets across the country.

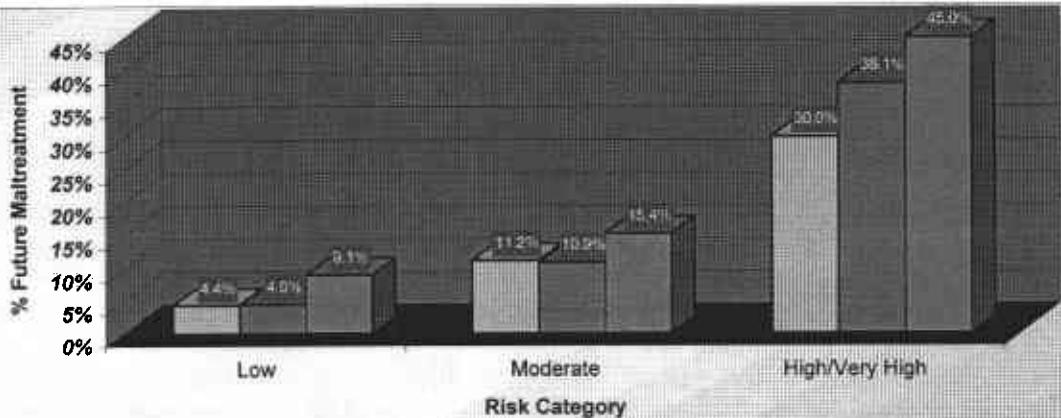
- The capacity of the CFRA to identify and target for assistance a relatively small subset of higher risk families among all those with unfounded index investigations could make assisting these families affordable.

The results of the risk x convenience sample interaction analysis are illustrated below in Figure 7.

Figure 7

Maltreatment As A Function Of Risk Within 2 Yrs. Of Start Of Unfounded Index Investigations Begun 1-1-  
to 6-30-'00. Two Convenience Samples Vs. Near Population Data  
(Total N = 639, no post-investigation services.)

- Large Convience Sample, L. A. County, N = 323, 74.8% Sampling Proportion
- Near Population Data, Orange County, N = 435, 81.5% Sampling Proportion
- Small Convenience Sample, Humboldt, San Luis Obispo, Sutter counties. N = 95, Avg. 27.6% Sampling Proportion



## **Persistence Of The Effects Of Extraneous Variables on Future Maltreatment In**

**The Analysis Of Interactions.** Relationships between some extraneous variables and future maltreatment persisted after the main effects of CFRA risk scores and CFRA risk interactions with extraneous variables were controlled statistically. These are worthy of note.

- Families in the catch-all racial/ethnic group "other/Unknown" were 31% less likely to have future substantiated incidents of maltreatment than were members of all other groups combined (median odds ratio for members of "Asian/Pacific Islander/other/unknown" racial ethnic group across 11 equations with both main effects and interaction terms present was .69; range of odds ratios was .36 to .74; eight odds ratios were statistically significant at  $p. < .05$ ; two odds ratio were in the expected direction (i.e. were less than 1.0, like the other odds ratios for this variable) but were not statistically significant. Families whose primary caretaker was known to be white, African American, or Hispanic were not in this group.)
- Families whose SDM Safety Assessment result indicated the presence of one or more safety problems and resulted in implementation of an in-home safety intervention during the initial investigation were 1.21 times (21%) more likely to have future substantiated incidents of maltreatment within two years of the initial report than were families whose SDM safety assessment found no safety problems (median odds ratio for all families across 11 equations with both main effects and interaction terms present was 1.21; range of odds ratios was .95 to 1.27; nine odds ratios were statistically significant at  $p. < .05$ . Two odds ratios (.95 and 1.27)—for the main effects of in-home safety intervention among families with unfounded index investigations—were not statistically significant).
- Families whose SDM Safety Assessment result indicated one or more safety problems and whose safety plan included the removal of one or more children during the initial investigation were 37% less likely to have future substantiated incidents of maltreatment within two years of the initial report than were families whose SDM safety assessment found no safety problems. (median odds ratio for these families across 11 equations with both main effects and interaction terms present was .63; range of odds ratios was .55 to .73; nine odds ratios were statistically significant at  $p. \leq .05$ . Two odds ratios were in the same direction as the other odds ratios but were not statistically significant).
- Families that received post-investigation services were 1.33 times (33%) more likely to have future substantiated incidents of maltreatment within two years of the initial report than were families that did not. (median odds ratio for these families across 11 equations with both main effects and interaction terms present was 1.33; range of odds ratios was 1.32 to 3.17; nine odds ratios were statistically significant at  $p. \leq .05$ . Two odds ratios were in the same direction as the other odds ratios but were not statistically significant).
- As noted earlier, the question of service effects will be addressed in a separate report.

**Results For Study Question 9: Will use of the CFRA (a research-based assessment instrument) improve the accuracy of child welfare worker assessments of future maltreatment likelihood relative to the accuracy of assessments made with clinical judgement and/or a consensus-based assessment approach?**

As noted earlier, procedures for use of the CFRA provide for child welfare worker override (i.e. modification) of the CFRA risk assessment finding arrived at solely by scoring the CFRA (referred to here as the "scored risk"). The overrides are of two kinds—"discretionary" (based on clinical judgement with supervisory concurrence) and "policy" (based on consensus among SDM counties regarding appropriate risk assessment procedures when certain case characteristics are encountered). The availability of cases where overrides were used allows a comparison of the accuracy of CFRA scored risk with the accuracy of the clinical- and consensus-based approaches to assessment inherent in discretionary and policy overrides. Assessment based on clinical judgement and/or consensus among practitioners are the available alternatives to research-based instruments like the CFRA for assessing risk of future maltreatment and are currently in use in many California counties. Thus comparison of CFRA scored risk accuracy with the accuracy of overrides gives us some information to answer study question 9—will the use of the CFRA improve child welfare worker decision-making capabilities?

To analyze the relative accuracy of CFRA scored risk versus override risk scores, four logistic regression equations, described in detail on p. 25, were estimated. Dependent variables modeled in these equations were substantiated maltreatment within two years of an initial maltreatment report and re-referral/reinvestigation within two years of an initial report. As noted previously, based on past experience, if they are accurate, both scored risk and override risk scores should be related to each of these case outcomes (Children's Research Center, 1995, 1998a). The results of the analyses appear below in Tables 20-23.

- Table 20, below, shows that adjusting for delivery of post-investigation services, cases with CFRA scored risk values of high and very high-risk are 6.31 times (531%) more likely than low-risk cases to have substantiated maltreatment incidents within 24 months of an initial report (odds ratio 6.31, p. = .034; 95% confidence interval boundaries 1.15 to 34.78).

As with previous logistic regression models, the possibility of collinearity in the model below was checked by computing variance inflation factors (VIF's) for each independent variable. The largest VIF for any variable was 1.45, indicating an absence of problematic levels of collinearity (Cohen, et. al, 2003).

**Table 20**

**Substantiated Maltreatment Within 24 Months Of Initial Referral As A Function Of CFRA Scored Risk And Post-investigation Service Provision (N = 114)**

	Wald Statistic	Statistical Significance	Odds Ratio	95% Confidence Interval Boundaries for Odds Ratio	
				Lower	Upper
<b>1. CFRA Scored Risk (Reference category = Low Risk)</b>	7.937	.019			
a. Moderate Risk	.038	.845	1.186	.216	6.516
b. High/Very High Risk	4.477	.034	6.312	1.145	34.781
<b>2. Post-Investigation Services (Reference category = No Post Investigation Services)</b>	.367	.545	1.559	.370	6.565
<b>Constant</b>	9.509	.002	.051		

- Table 21, below, shows that the odds ratios for cases with override risk scores of high or very high-risk (1.159 and 1.209, respectively) are not statistically significant (p. values .883, and .821 respectively). This means that cases with override risk scores of high or very high-risk are no more likely to have substantiated maltreatment incidents within 24 months of an initial report than are cases with low/moderate override risk scores.

**Table 21**

**Substantiated Maltreatment Within 24 Months Of Initial Referral As A Function Of Override Risk Scores And Post-investigation Service Provision (N = 114)**

	Wald Statistic	Statistical Significance	Odds Ratio	95% Confidence Interval Boundaries for Odds Ratio	
				Lower	Upper
<b>1. Override Risk Score (Reference category = Low/Moderate Risk)</b>	.052	.975			
a. High Risk	.022	.883	1.159	.162	8.282
b. Very High Risk	.051	.821	1.209	.235	6.228
<b>2. Post-Investigation Services (Reference category = No Post Investigation Services)</b>	.030	.861	1.134	.278	4.628
<b>Constant</b>	6.569	.010	.109		

As with previous logistic regression models, the possibility of collinearity in the above model was checked by computing variance inflation factors (VIF's) for each independent variable. The largest VIF for any variable was 5.51, indicating an absence of problematic levels of collinearity (Cohen, et. al, 2003).

- The data in Table 22, below, indicate that cases with CFRA scored risk values of high and very high-risk are 5.28 times (428%) more likely than cases with CFRA scored risk values of low-risk to be re-referred and reinvestigated within 24 months of an initial report (odds ratio 5.278, p. = .017; 95% confidence interval boundaries 1.352 to 20.605).

**Table 22**

**Re-referral/Reinvestigation Within 24 Months Of Initial Referral As A Function Of CFRA Scored Risk And Post-investigation Service Provision (N = 114)**

	Wald Statistic	Statistical Significance	Odds Ratio	95% Confidence Interval Boundaries for Odds Ratio	
				Lower	Upper
<b>1. CFRA Scored Risk (Reference category = Low Risk)</b>	7.358	.025			
a. Moderate Risk	.423	.515	1.506	.439	5.165
b. High/Very High Risk	5.731	.017	5.278	1.352	20.605
<b>2. Post-Investigation Services (Reference category = No Post Investigation Services)</b>	.949	.330	1.773	.560	5.614
<b>Constant</b>	9.757	.002	.100		

As with previous logistic regression models, the possibility of collinearity in the above model was checked by computing variance inflation factors (VIF's) for each independent variable. The largest VIF for any variable was 1.45, indicating an absence of problematic levels of collinearity (Cohen, et. al, 2003).

- Table 23, below, shows that the odds ratios for cases with override risk scores of high or very high-risk (2.042 and 1.502, respectively) are not statistically significant (p. values .372 and .559, respectively). This means that cases with override risk scores of high or very high-risk are no more likely to be re-referred and re-investigated within 24 months of an initial report than are cases with low/moderate override risk scores.

**Table 23**

**Re-referral/Reinvestigation Within 24 Months Of Initial Referral As A Function Of  
Override Risk Scores And Post-investigation Service Provision**

	Wald Statistic	Statistical Significance	Odds Ratio	95% Confidence Interval Boundaries for Odds Ratio	
				Lower	Upper
<b>1. Override Risk Score (Reference category = Low/Moderate Risk)</b>	.813	.666			
a. High Risk	.798	.372	2.042	.426	9.783
b. Very High Risk	.341	.559	1.502	.384	5.883
<b>2. Post-Investigation Services (Reference category = No Post Investigation Services)</b>	.118	.731	1.220	.393	3.787
<b>Constant</b>	6.159	.013	.167		

As with previous logistic regression models, the possibility of collinearity in the above model was checked by computing variance inflation factors (VIF's) for each independent variable. The largest VIF for any variable was 5.51, indicating an absence of problematic levels of collinearity (Cohen, et. al, 2003).

- Taken together, the data in Tables 20-23 indicate that child welfare worker's risk assessment accuracy is better when they rely on CFRA scored risk ratings than when they override CFRA scored risk and assign different risk ratings to cases. This supports the hypothesis that use of the CFRA, a research-based risk assessment instrument, helps to achieve the 1<sup>st</sup> goal of SDM—improving the decision-making capabilities of child welfare workers.
- Despite the small sample size in the present analysis (N = 114), the results are consistent with extensive evidence on the relative accuracy of research-based, versus clinical and/or consensus-based risk assessments. In a definitive review published in what is arguably America's most prestigious scientific journal, *Science Magazine*, actuarial (i.e. research-based) assessment was found to be more accurate than clinical assessment (Dawes, Faust, and Meehl, 1989). In two recent studies appearing in reputable child welfare journals, research-based assessment has been found to be more accurate than consensus-based assessment (Baird, et. al, 1999; Baird and Wagner, 2000).
- The above results do not imply that discretionary and policy overrides of CFRA scored risk should be eliminated. The purpose of the override feature in all SDM assessment instruments is to give child welfare staff the flexibility to take into account the myriad of unusual circumstances they may encounter as they formulate their assessments of maltreatment risk, family strengths and needs, etc. No brief research instrument

containing only 20 items can include all the conditions that might become important to the formulation of accurate assessments by child welfare staff working under severe time constraints on difficult cases in sometimes dangerous field settings.

**Results For Study Questions 10-12: (10) Are SDM Safety Assessment scores positively associated with CFRA scores, providing convergent validity evidence in support of the Safety Assessment? (11) Is need, as measured with the FSNA, positively associated with CFRA scores, providing convergent validity evidence in support of the FSNA? (12) Is need, as measured with the FSNA, positively associated with SDM Safety Assessment scores, providing convergent validity evidence in support of both the FSNA and the Safety Assessment?**

Among the SDM instruments for which the current dataset provides some useful data are two consensus-based instruments—the SDM Safety Assessment and the Family Strengths and Needs Assessment (FSNA). The Safety Assessment is used at the first contact with a reported family to decide which children may safely be left at home pending completion of an investigation of maltreatment allegations and which children must be placed in out-of-home care to insure their safety. The FSNA is used when a decision is made to provide post-investigation services to identify the three most severe service need domains to be included in the case plan.

As mentioned earlier, these are instruments whose items and scoring protocols cannot easily be validated against behavioral criteria with available data. As an alternative to validation against behavioral criteria their correlations with CFRA scored risk were examined to assess their "convergent validity". Convergent validity exists when measures that theory suggests should be correlated in a particular way are found to correlate as expected (Judd, Kidder, and Smith, 1991). The theory relied upon in this test of convergent validity was that CFRA risk scores, SDM Safety Assessment scores, and FSNA total need scores should all correlate positively with one another. Specifically, we should find the following: (1) Higher Safety Assessment scores, which indicate greater danger to children when assessed during the first contact with the family, should be associated with higher CFRA risk scores, indicating greater likelihood of future maltreatment; (2) Higher FSNA total need scores, which indicate more family difficulties impeding tertiary prevention efforts, should be associated with higher CFRA risk scores, which indicate greater likelihood of future maltreatment; and (3) Higher FSNA total need scores, which indicate more family difficulties impeding tertiary prevention efforts, should be associated with higher Safety Assessment scores, indicating greater danger to children when assessed during the first contact with the family.

In calculating the correlation between CFRA risk scores and SDM Safety Assessment scores, 7685 Sample 2 cases were available and were used. In calculating correlations between FSNA total need scores and other variables (CFRA risk scores and SDM Safety Assessment scores), 859 FSNA total need scores, covering 75% of 1142 cases that received post-investigation services, were available and were included. The FSNA is to be completed only when post-investigation services are provided. Table 24, below, shows the correlations among CFRA risk scores, SDM Safety Assessment Scores, and FSNA total need scores.

- The data in Table 24 show evidence of convergent validity for the SDM Safety Assessment and FSNA. Higher CFRA risk scores are associated with higher SDM Safety Assessment scores ( $r = .502$ ,  $p < .0005$ ) and with higher FSNA total needs scores ( $r = .343$ ,  $p < .0005$ ). SDM Safety Assessment scores are associated with FSNA total need scores ( $r = .201$ ,  $p < .0005$ ).

**Table 24**

**Correlations Among CFRA Scored Risk, SDM Safety Assessment Scores, and SDM Family Strengths and Needs Assessment Total Need Scores**

Spearman's rho	CFRA Scored Risk	Correlation Coefficient Statistical Significance (2-tailed) N	SDM Safety Assessment Score	FSNA Total Need Score
			.502 .000 7684	.343 .000 859
	SDM Safety Assessment Score	Correlation Coefficient Statistical Significance (2-tailed) N	*****	.201 .000 859

- The correlations among the CFRA, the SDM Safety Assessment and the FSNA show that when one of these instruments indicates danger to children and/or family problems the other instruments are likely to register these difficulties as well. These correlations among the assessment scores give some assurance that there will be congruence in assessment results arrived at by different child welfare workers assessing the same cases. Starkly inconsistent, incongruent assessment results are a feature of many news stories depicting failures of the child welfare system to protect vulnerable children.

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## Appendix I

### Listing Of Participating SDM Counties And Their Implementation Dates

County	Month of SDM Implementation
1. Humboldt	2/99
2. Orange	4/99
3. Sacramento	11/99
4. San Bernardino*	11/99
5. Santa Clara**	11/99
6. Sutter	12/99
7. Los Angeles	1/00***, 2003***
8. San Luis Obispo	2/00
9. Monterey	3/00
10. Fresno	3/00
11. Kern	4/00
12. Trinity	7/00
13. Merced	10/00
14. Alameda	4/02
15. Santa Cruz	5/01
16. Del Norte	6/03
17. El Dorado	6/03
18. Riverside	6/03

\* No longer participating.

\*\* Partial implementation-Risk assessment and other important assessments not in use.

\*\*\* Implementation in one district (Santa Fe Springs) and countywide Hotline. 2003 implementation countywide.

## Appendix I

### CALIFORNIA FAMILY RISK ASSESSMENT

Case Name: \_\_\_\_\_

Case #: \_\_\_\_\_

Date: \_\_\_\_\_

County Name: \_\_\_\_\_

Worker Name: \_\_\_\_\_

Worker ID#: \_\_\_\_\_

**NEGLECT****N1. Current Complaint is for Neglect**

- a. No ..... 0  
 b. Yes ..... 1

Score \_\_\_\_\_

**ABUSE****A1. Current Complaint is for Abuse**

- a. No ..... 0  
 b. Yes ..... 1

Score \_\_\_\_\_

**N2. Prior Investigations (assign highest score that applies)**

- a. None ..... 0  
 b. One or more, abuse only ..... 1  
 c. One or two for neglect ..... 2  
 d. Three or more for neglect ..... 3

Score \_\_\_\_\_

**A2. Number of Prior Abuse Investigations (number)**

- a. None ..... 0  
 b. One ..... 1

Score \_\_\_\_\_

**N3. Household has Previously Received CPS (voluntary/court-order)**

- a. No ..... 0  
 b. Yes ..... 1

Score \_\_\_\_\_

**A3. Household has Previously Received CPS (voluntary/court-ordered)**

- a. No ..... 0  
 b. Yes ..... 1

Score \_\_\_\_\_

**N4. Number of Children Involved in the CA/N Incident**

- a. One, two, or three ..... 0  
 b. Four or more ..... 1

Score \_\_\_\_\_

**A4. Prior Injury to a Child Resulting from CA/N**

- a. No ..... 0  
 b. Yes ..... 1

Score \_\_\_\_\_

**N5. Age of Youngest Child in the Home**

- a. Two or older ..... 0  
 b. Under two ..... 1

Score \_\_\_\_\_

**A5. Primary Caretaker's Assessment of Incident (check applicable items and add for score)**

- a. Not applicable ..... 0  
 b. Blames child ..... 1  
 c. Justifies maltreatment of a child ..... 2

Score \_\_\_\_\_

**N6. Primary Caretaker Provides Physical Care Inconsistent with Child Needs**

- a. No ..... 0  
 b. Yes ..... 1

Score \_\_\_\_\_

**A6. Domestic Violence in the Household in the Past Year**

- a. No ..... 0  
 b. Yes ..... 1

Score \_\_\_\_\_

**N7. Primary Caretaker has a Past or Current Mental Health Problem**

- a. No ..... 0  
 b. Yes ..... 1

Score \_\_\_\_\_

**A7. Primary Caretaker Characteristics (check applicable items and add for score)**

- a. Not applicable ..... 0  
 b. Provides insufficient emotional/psychological support ..... 1  
 c. Employs excessive/inappropriate discipline ..... 1  
 d. Domineering parent ..... 1

Score \_\_\_\_\_

**N8. Primary Caretaker has Historic or Current Alcohol or Drug Problem. (Check applicable items and add for score)**

- a. Not applicable ..... 0  
 b. Alcohol (current or historic) ..... 1  
 c. Drug (current or historic) ..... 1

Score \_\_\_\_\_

**A8. Primary Caretaker has a History of Abuse or Neglect as a Child**

- a. No ..... 0  
 b. Yes ..... 1

Score \_\_\_\_\_

**N9. Characteristics of Children in Household (Check applicable items and add for score)**

- a. Not applicable ..... 0  
 b. Medically fragile/failure to thrive ..... 1  
 c. Developmental or physical disability ..... 1  
 d. Positive toxicology screen at birth ..... 1

Score \_\_\_\_\_

**A9. Secondary Caretaker has Historic or Current Alcohol or Drug Problem**

- a. No ..... 0  
 b. Yes, alcohol and/or drug (check all applicable) ..... 1  
 Alcohol ..... Drug

Score \_\_\_\_\_

**N10. Housing (check applicable items and add for score)**

- a. Not applicable ..... 0  
 b. Current housing is physically unsafe ..... 1  
 c. Homeless at time of investigation ..... 2

Score \_\_\_\_\_

**A10. Characteristics of Children in Household (check appropriate items and add for score)**

- a. Not applicable ..... 0  
 b. Delinquency history ..... 1  
 c. Developmental disability ..... 1  
 d. Mental health/behavioral problem ..... 1

Score \_\_\_\_\_

**TOTAL NEGLECT RISK SCORE** \_\_\_\_\_**TOTAL ABUSE RISK SCORE** \_\_\_\_\_

## Appendix I

### Risk Assessment Form (con.)

**SCORED RISK LEVEL.** Assign the family's scored risk level based on the highest score on either the neglect or abuse instrument, using the following chart:

<u>Neglect Score</u>	<u>Abuse Score</u>	<u>Scored Risk Level</u>
0 - 1	0 - 1	Low
2 - 4	2 - 4	Moderate
5 - 8	5 - 7	High
9 +	8 +	Very High

**POLICY OVERRIDES.** Circle yes if a condition shown below is applicable in this case. If any condition is applicable, override final risk level to very high.

Yes No 1. Sexual abuse case AND the perpetrator is likely to have access to the child victim.

Yes No 2. Non-accidental injury to a child under age two.

Yes No 3. Severe non-accidental injury.

Yes No 4. Parent/caretaker action or inaction resulted in death of a child due to abuse or neglect (previous or current).

**DISCRETIONARY OVERRIDE.** If a discretionary override is made, circle yes, circle override risk level, and indicate reason. Risk level may be overridden one level higher.

Yes No 5. If yes, override risk level (circle one):      Low      Moderate      High      Very High

Discretionary override reason: \_\_\_\_\_

Supervisors Review/Approval of Discretionary Override: \_\_\_\_\_ Date: \_\_\_\_\_. \_\_\_\_\_. \_\_\_\_\_. / /

**FINAL RISK LEVEL** (circle final level assigned):    Low      Moderate      High      Very High

## Appendix I

### CALIFORNIA SAFETY ASSESSMENT

Case Name: \_\_\_\_\_ Case #: \_\_\_\_\_ County: \_\_\_\_\_

**Names of Children Assessed:**

1. \_\_\_\_\_ 4. \_\_\_\_\_  
2. \_\_\_\_\_ 5. \_\_\_\_\_  
3. \_\_\_\_\_ 6. \_\_\_\_\_

(If more than six children are assessed, add additional names and numbers on reverse side.)

**Are there additional names on reverse?** 1. Yes      2. No

**Date of Child Maltreatment Referral:** \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

**Date of Assessment:** \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_ **Worker:** \_\_\_\_\_

**SECTION 1: SAFETY FACTORS**

Assess household for each of the following safety factors. Indicate whether currently available information results in reason to believe safety factor is present. Check all that apply.

1. Caretaker(s) caused serious physical harm to the child(ren), or made a plausible threat to cause serious physical harm in the current investigation indicated by:  
 Serious injury or abuse to child(ren) other than accidental;  
 Caretaker(s) fears s/he will maltreat child(ren);  
 Threat to cause harm or retaliate against child(ren);  
 Excessive discipline or physical force;  
 Drug-exposed infant.
2. Current circumstances, combined with information that the caretaker(s) has or may have previously maltreated child(ren) in their care, suggests that the child(ren)'s safety may be of immediate concern based on the severity of the previous maltreatment or the caretaker(s)' response to the previous incident.
3. Child sexual abuse is suspected and circumstances suggest that child(ren)'s safety may be of immediate concern.
4. Caretaker fails to protect child(ren) from serious harm or threatened harm by others. This may include physical abuse, sexual abuse, or neglect.
5. Caretaker(s)' explanation for the injury to the child(ren) is questionable or inconsistent with type of injury, and the nature of the injury suggests that the child(ren)'s safety may be of immediate concern.
6. The family refuses access to the child(ren) or there is reason to believe that the family is about to flee.
7. Caretaker(s) does not meet the child(ren)'s immediate needs for supervision, food, clothing, and/or medical or mental health care.
8. The physical living conditions are hazardous and immediately threatening to the health and/or safety of the child(ren).
9. Caretaker(s)' current substance abuse seriously impairs his/her ability to supervise, protect, or care for the child(ren).
10. Domestic violence exists in the home and poses a risk of serious physical and/or emotional harm to the child(ren).
11. Caretaker(s) describes child(ren) in predominantly negative terms or acts toward child(ren) in negative ways that result in the child(ren) being a danger to self or others, acting out aggressively, or being severely withdrawn and/or suicidal.
12. Caretaker(s)' emotional stability, developmental status, or cognitive deficiency seriously impairs their current ability to supervise, protect, or care for the child.
13. Other (specify): \_\_\_\_\_

## **Appendix I**

### **Safety Assessment Form (con.)**

#### **SECTION 2: SAFETY INTERVENTIONS**

If no safety factors are present, skip to Section 3. If one or more safety factors are present, consider whether safety interventions 1-9 will allow child(ren) to remain in the home for the present time. Check the item number for all safety interventions that will be implemented. If there are no available safety interventions that would allow the child(ren) to remain in the home, indicate by checking item ten, and follow procedures for taking child(ren) into protective custody.

Check all that apply:

1. Intervention or direct services by worker.
2. Use of family, neighbors, or other individuals in the community as safety resources.
3. Use of community agencies or services as safety resources.
4. Have the alleged perpetrator leave the home, either voluntarily or in response to legal action.
5. Have the non-offending caretaker move to a safe environment with the child(ren).
6. Have caretaker appropriately protect victim from the alleged perpetrator.
7. Have the caretaker(s) voluntarily place the child(ren) outside the home.
8. Legal action planned or initiated -- child(ren) remains in the home.
9. Other (specify): \_\_\_\_\_
10. Child(ren) placed in protective custody because interventions 1-9 do not adequately assure child(ren)'s safety.

#### **SECTION 3: SAFETY DECISION**

Identify the safety decision by checking the appropriate line below. This decision should be based on the assessment of all safety factors, safety interventions, and any other information known about the case. Check one line only.

1. \_\_\_\_\_ No safety factors were identified at this time. Based on currently available information, there are no children likely to be in immediate danger of serious harm.
2. \_\_\_\_\_ One or more safety factors are present, and protecting safety interventions have been planned or taken. Based on protecting interventions, child(ren) will remain in the home at this time.
3. \_\_\_\_\_ One or more safety factors are present, and placement is the only protecting intervention possible for one or more children. Without placement, one or more children will likely be in danger of immediate or serious harm.

All children placed.

The following children were placed: (*enter number from page 1*)

## Appendix I

### CALIFORNIA FAMILY STRENGTHS AND NEEDS ASSESSMENT (For Caretakers and Children)

c: 10/98

Case Name: \_\_\_\_\_ Case Number: \_\_\_\_\_

Date of Referral: \_\_\_\_\_ Date of Assessment: \_\_\_\_\_ Initial or Reassess #: 1 2 3 4 5 \_\_\_\_\_

County: \_\_\_\_\_ Worker: \_\_\_\_\_

1. Child Name: \_\_\_\_\_ Case #: \_\_\_\_\_ Child Name: \_\_\_\_\_ Case #: \_\_\_\_\_

2. Child Name: \_\_\_\_\_ Case #: \_\_\_\_\_ Child Name: \_\_\_\_\_ Case #: \_\_\_\_\_

3. Child Name: \_\_\_\_\_ Case #: \_\_\_\_\_ Child Name: \_\_\_\_\_ Case #: \_\_\_\_\_

The following items should be considered for each family/household member. Worker should base score on their assessment for each item, taking into account family's perspective, child's perspective where appropriate, worker observations, collateral contacts, and available records. Refer to accompanying definitions to determine the most appropriate response. Enter the score for each item.

**A. CARETAKER - Rate each caretaker and enter lowest score.****SN1. Substance Abuse/Use** ..... Score

(Substances: alcohol, illegal drugs, inhalants, prescription/over-the-counter drugs.)

- a. Teaches and demonstrates healthy understanding of alcohol and drugs ..... +3  
b. Alcohol or prescribed drug use ..... 0  
c. Alcohol or drug abuse ..... -3  
d. Chronic alcohol/drug abuse ..... -5

If C or D, check all that apply:

Heroin	Other Stimulants	Other Tranquilizers
Alcohol	Cocaine/Crack	Non-Prescription Methadone
Barbiturates	Marijuana/Hash	Other Opiates and Synthetics
Other sedatives or hypnotics	PCP	Inhalants
Methamphetamine	Tranquilizers	Over-the-Counter
Other Amphetamines	(Benzodiazepine)	Other (specify): _____

**SN2. Household Relationships**

- a. Supportive ..... +3  
b. Minor/occasional discord ..... 0  
c. Frequent discord ..... -3  
d. Chronic discord ..... -5

**SN3. Domestic Violence**

- a. Individuals promote non-violence in the home ..... +3  
b. No threatening or assaultive behaviors among household members ..... 0  
c. Physical violence/controlling behavior ..... -3  
d. Repeated and/or severe physical violence ..... -5

**SN4. Social Support System**

- a. Strong support system ..... +2  
b. Adequate support system ..... 0  
c. Limited support system ..... -2  
d. No support system ..... -4

## Appendix I

### Strengths and Needs Assessment (con.)

SN5. Parenting Skills .....	Score
a. Strong skills.....	+2
b. Adequately parents and protects child(ren) .....	0
c. Inadequately parents and protects child(ren) .....	-2
d. Destructive/abusive parenting .....	-4

### SN6. Mental Health/Coping Skills

a. Strong coping skills .....	+2
b. Adequate coping skills .....	0
c. Mild to moderate symptoms .....	-2
d. Chronic/severe symptoms .....	-4

### SN7. Household History of Criminal Behavior or Child Abuse and Neglect (CA/N)

a. Promotes positive values .....	+1
b. No criminal behavior or child maltreatment history, or successful problem resolution .....	0
c. Active involvement .....	-1
d. Chronic/severe involvement .....	-3

If response is B, C, or D, identify household member involved and type of history (check all that apply):  
(If criminal history is not available, write AN/A@ in the space provided.)

Criminal	CA/N	
_____	_____	Primary Caretaker
_____	_____	Secondary Caretaker
_____	_____	Other Adult
_____	_____	Juvenile

### SN8. Resource Management/Basic Needs

a. Resources sufficient to meet basic needs and are adequately managed .....	+1
b. Resources are limited but are adequately managed .....	0
c. Resources are insufficient or not well-managed .....	-1
d. No resources or resources severely limited and/or mismanaged .....	-3

### SN9. Cultural/Community

a. Strong cultural/community resources .....	+1
b. Some cultural/community resources .....	0
c. Limited cultural/community resources .....	-1
d. Disconnected from cultural/community resources .....	-3

### SN10. Physical Health

a. Preventive health care is practiced .....	+1
b. Health issues do not affect family functioning .....	0
c. Health concerns/handicaps affect family functioning .....	-1
d. Serious health concerns/handicaps result in inability to care for child(ren) .....	-2

### SN11. Communication Skills

a. Strong skills .....	+1
b. Functional skills .....	0
c. Limited skills .....	-1
d. Severely limited skills .....	-2

## Appendix I

### **SDM Assessment Instruments and Associated Decision Points**

1. The first SDM instrument used in case management is the **Response Priority Assessment**. This instrument is used after a decision to investigate a maltreatment report is made. It is used to decide how quickly to investigate the report (immediately [within 24 hours], or within 10 days).
2. The second SDM instrument used in case management is the **SDM Safety Assessment**. The Safety Assessment is used upon first contact with a family being investigated for reported maltreatment. It is used to decide whether there are any safety-related problems in the family requiring intervention. It is described in detail in Section II. of the report, entitled "Instruments and Measures".
3. The third SDM instrument used in case management is the SDM risk assessment, called the **California Family Risk Assessment**. It is a research-based assessment completed at the end of an investigation of a child maltreatment report to assist in deciding whether post-investigation services should be provided and, if so, how many monthly contacts there should be. It provides an estimate of the likelihood of maltreatment occurrence or recurrence within 24 months of the receipt of the initial maltreatment report. It is described in detail in Section II. of the report.
4. The fourth SDM instrument is the **Family Strengths and Needs Assessment (FSNA)** for caretakers and children. This assessment is used to assess domains of family and child functioning to identify the areas of greatest service need in cases where a decision has been made after investigation of a maltreatment report to provide post-investigation services. The FSNA is described in detail in Section II. of the report.
5. The fifth and sixth SDM assessments are the **Family Risk Reassessment** and the **Family Strengths and Needs Reassessment**. These are reassessments to be completed periodically or when family circumstances change. These assessments insure that risk and family functioning are regularly reassessed and appropriate case management actions (e.g. delivery of needed services, case closure, or continuation in open status) are taken.
6. The final SDM assessments are the **Reunification Reassessment** and the **Reunification Safety Assessment**. These assessments are used to assess child custody cases to determine whether risk and safety levels in a child's home will allow the child to return home from foster care placement.

Detailed information on each SDM assessment, including definitions of terms and procedures for use, is available from the Children's Research Center, Madison, WI. (608-881-3282).

## Appendix II

**TABLE 1**

**Risk x African American And Other Variables In Relation To Substantiated Maltreatment Recurrence Within 24 Months Of Initial Referral (In this analysis there were N = 6543 cases closed after the initial investigation, and N = 1142 cases opened for service after the initial investigation, for a total of N = 7685.)**

	Wald Statistic	Statistical Significance	Odds Ratio	95.0% Confidence Interval Boundaries For Odds Ratio	
				Lower	Upper
<b>1. Race Of Primary Caretaker (Reference Category = White)</b>	14.319	.003			
a. African American	.054	.816	.932	.513	1.693
b. Hispanic	9.287	.002	.795	.686	.921
c. Other/Unknown	8.889	.003	.687	.537	.879
<b>2. Large County Size (Reference Category = Small)</b>	1.674	.196	.845	.654	1.091
<b>3. Allegation Disposition (Reference Category = Unfounded)</b>	2.526	.283			
a. Allegation Disposition Inconclusive	1.396	.237	1.163	.905	1.494
b. Allegation Disposition Substantiated	.125	.724	1.049	.803	1.372
<b>4. Safety Finding (Reference Category = No Safety Problems Found)</b>	20.139	.000			
a. One Or More Safety Problems + In-Home Safety Intervention	5.201	.023	1.209	1.027	1.422
b. One Or More Safety Problems/ 1+ Children Removed	6.288	.012	.634	.444	.905
<b>5. Post-Investigation Services (Reference category = No Post Investigation Services)</b>	7.397	.007	1.332	1.083	1.638
<b>6. Risk (Reference category = Low Risk)</b>	121.377	.000			
a. Moderate Risk	23.462	.000	1.603	1.324	1.940
b. High/Very High Risk	110.421	.000	3.453	2.741	4.351
<b>7. Risk x Race/ethnicity Interaction (Reference category = Not Af. Amer. And/Or Low Risk)</b>	1.156	.561			
a. Moderate Risk x Af. Amer.	.509	.476	1.285	.645	2.557
b. High/Very High Risk x Af. Amer.	.026	.872	.937	.425	2.067
<b>Constant</b>	166.856	.000	.105		

## Appendix II

**TABLE 2**

**Risk x White And Other Variables In Relation To Substantiated Maltreatment Recurrence Within 24 Months Of Initial Referral (In this analysis there were N = 6543 cases closed after the initial investigation, and N = 1142 cases opened for service after the initial investigation, for a total of N = 7685.)**

	Wald Statistic	Statistical Significance	Odds Ratio	95.0% Confidence Interval Boundaries For Odds Ratio	
				Lower	Upper
<b>1. Race Of Primary Caretaker (Reference Category = White)</b>	6.789	.079			
a. African American	.357	.550	1.130	.758	1.684
b. Hispanic	.864	.353	.859	.622	1.184
c. Other/Unknown	2.408	.121	.742	.509	1.082
<b>2. Large County Size (Reference Category = Small)</b>	1.679	.195	.844	.654	1.091
<b>3. Allegation Disposition (Reference Category = Unfounded)</b>	2.548	.280			
a. Allegation Disposition Inconclusive	1.449	.229	1.166	.908	1.499
b. Allegation Disposition Substantiated	.144	.705	1.053	.806	1.376
<b>4. Safety Finding (Reference Category = No Safety Problems Found)</b>	20.442	.000			
a. One Or More Safety Problems + In-Home Safety Intervention	5.048	.025	1.205	1.024	1.418
b. One Or More Safety Problems/ 1+ Children Removed	6.637	.010	.626	.439	.894
<b>5. Post-Investigation Services (Reference category = No Post Investigation Services)</b>	7.306	.007	1.330	1.082	1.635
<b>6. Risk (Reference category = Low Risk)</b>	77.153	.000			
a. Moderate Risk	15.534	.000	1.566	1.253	1.958
b. High/Very High Risk	74.533	.000	3.414	2.584	4.512
<b>7. Risk x Race/ethnicity Interaction (Reference category = Non-White, And/Or Low Risk)</b>	.445	.801			
a. Moderate Risk x White	.389	.533	1.123	.779	1.619
b. High/Very High Risk x White	.062	.803	1.053	.702	1.580
<b>Constant</b>	127.323	.000	.099		

## Appendix II

**TABLE 3**

**Risk x Hispanic And Other Variables In Relation To Substantiated Maltreatment Recurrence Within 24 Months Of Initial Referral (In this analysis there were N = 6543 cases closed after the initial investigation, and N = 1142 cases opened for service after the initial investigation, for a total of N = 7685.)**

	Wald Statistic	Statistical Significance	Odds Ratio	95.0% Confidence Interval Boundaries For Odds Ratio	
				Lower	Upper
<b>1. Race Of Primary Caretaker (Reference Category = White)</b>	9.311	.025			
a. African American	.129	.720	1.052	.798	1.386
b. Hispanic	.038	.845	.970	.717	1.313
c. Other/Unknown	8.584	.003	.691	.539	.885
<b>2. Large County Size (Reference Category = Small)</b>	1.680	.195	.844	.654	1.091
<b>3. Allegation Disposition (Reference Category = Unfounded)</b>	2.591	.274			
a. Allegation Disposition Inconclusive	1.468	.226	1.168	.909	1.500
b. Allegation Disposition Substantiated	.144	.704	1.053	.806	1.377
<b>4. Safety Finding (Reference Category = No Safety Problems Found)</b>	20.582	.000			
a. One Or More Safety Problems + In-Home Safety Intervention	5.145	.023	1.207	1.026	1.421
b. One Or More Safety Problems/ 1+ Children Removed	6.610	.010	.627	.440	.895
<b>5. Post-Investigation Services (Reference category = No Post Investigation Services)</b>	7.569	.006	1.337	1.087	1.645
<b>6. Risk (Reference category = Low Risk)</b>	81.682	.000			
a. Moderate Risk	24.584	.000	1.897	1.473	2.443
b. High/Very High Risk	77.445	.000	3.701	2.765	4.953
<b>7. Risk x Race/ethnicity Interaction (Reference category = Non-Hispanic, And/Or Low Risk)</b>	3.818	.148			
a. Moderate Risk x Hispanic,	3.246	.072	.726	.513	1.028
b. High/Very High Risk x Hispanic	.295	.587	.896	.602	1.334
<b>Constant</b>	150.188	.000	.094		

## Appendix II

**TABLE 4**

**Risk x Asian/Pacific Islander/Other/Unknown And Other Variables In Relation To Substantiated Maltreatment Recurrence Within 24 Months Of Initial Referral (In this analysis there were N = 6543 cases closed after the initial investigation, and N = 1142 cases opened for service after the initial investigation, for a total of N = 7685.)**

	Wald Statistic	Statistical Significance	Odds Ratio	95.0% Confidence Interval Boundaries For Odds Ratio	
				Lower	Upper
<b>1. Race Of Primary Caretaker (Reference Category = White)</b>	15.115	.002			
a. African American	.095	.758	1.044	.793	1.376
b. Hispanic	9.548	.002	.793	.684	.919
c. Other/Unknown	6.119	.013	.519	.309	.873
<b>2. Large County Size (Reference Category = Small)</b>	1.612	.204	.847	.656	1.094
<b>3. Allegation Disposition (Reference Category = Unfounded)</b>	2.486	.289			
a. Allegation Disposition Inconclusive	1.391	.238	1.163	.905	1.494
b. Allegation Disposition Substantiated	.130	.719	1.050	.804	1.373
<b>4. Safety Finding (Reference Category = No Safety Problems Found)</b>	20.623	.000			
a. One Or More Safety Problems + In-Home Safety Intervention	5.185	.023	1.208	1.027	1.422
b. One Or More Safety Problems/ 1+ Children Removed	6.592	.010	.628	.440	.896
<b>5. Post-Investigation Services (Reference category = No Post Investigation Services)</b>	7.337	.007	1.331	1.082	1.637
<b>6. Risk (Reference category = Low Risk)</b>	116.422	.000			
a. Moderate Risk	20.746	.000	1.566	1.291	1.900
b. High/Very High Risk	104.580	.000	3.359	2.663	4.237
<b>7. Risk x Race/ethnicity Interaction (Reference category = Not Other/Unknown, And/Or Low Risk)</b>	1.872	.392			
a. Moderate Risk x Asian/Pac. Islander/Other/Unknown	1.819	.177	1.508	.830	2.739
b. High/Very High Risk x Asian/Pac. Islander/Other/Unknown	.388	.533	1.263	.606	2.631
<b>Constant</b>	163.296	.000	.107		

## Appendix II

**TABLE 5**

**Risk x Inconclusive And Other Variables In Relation To Substantiated Maltreatment Recurrence Within 24 Months Of Initial Referral** (In this analysis there were N = 6543 cases closed after the initial investigation, and N = 1142 cases opened for service after the initial investigation, for a total of N = 7685.)

	Wald Statistic	Statistical Significance	Odds Ratio	95.0% Confidence Interval Boundaries For Odds Ratio	
				Lower	Upper
<b>1. Race Of Primary Caretaker (Reference Category = White)</b>	15.963	.001			
a. African American	.101	.750	1.046	.794	1.378
b. Hispanic	9.237	.002	.796	.687	.922
c. Other/Unknown	8.840	.003	.688	.538	.880
<b>2. Large County Size (Reference Category = Small)</b>	1.637	.201	.846	.655	1.093
<b>3. Allegation Disposition (Reference Category = Unfounded)</b>	3.801	.150			
a. Allegation Disposition Inconclusive	3.175	.075	1.366	.969	1.924
b. Allegation Disposition Substantiated	.007	.934	1.012	.769	1.331
<b>4. Safety Finding (Reference Category = No Safety Problems Found)</b>	20.689	.000			
a. One Or More Safety Problems + In-Home Safety Intervention	5.410	.020	1.215	1.031	1.431
b. One Or More Safety Problems/ 1+ Children Removed	6.551	.010	.628	.439	.897
<b>5. Post-Investigation Services (Reference category = No Post Investigation Services)</b>	6.773	.009	1.318	1.070	1.622
<b>6. Risk (Reference category = Low Risk)</b>	83.192	.000			
a. Moderate Risk	18.673	.000	1.884	1.414	2.511
b. High/Very High Risk	71.496	.000	3.980	2.889	5.481
<b>7. Risk x Investigation Disposition Interaction (Reference category = Substantiated Or Unfounded, And/Or Low Risk)</b>	1.808	.405			
a. Moderate Risk x Inconclusive Investigation,	1.664	.197	.788	.548	1.132
b. High/Very High Risk x Inconclusive Investigation	1.280	.258	.783	.513	1.196
<b>Constant</b>	154.734	.000	.095		

## Appendix II

**TABLE 6**

**Risk x Substantiated And Other Variables In Relation To Substantiated Maltreatment Recurrence Within 24 Months Of Initial Referral (In this analysis there were N = 6543 cases closed after the initial investigation, and N = 1142 cases opened for service after the initial investigation, for a total of N = 7685.)**

	Wald Statistic	Statistical Significance	Odds Ratio	95.0% Confidence Interval Boundaries For Odds Ratio	
				Lower	Upper
<b>1. Race Of Primary Caretaker (Reference Category = White)</b>	16.126	.001			
a. African American	.096	.756	1.045	.793	1.377
b. Hispanic	9.415	.002	.794	.685	.920
c. Other/Unknown	8.882	.003	.688	.537	.880
<b>2. Large County Size (Reference Category = Small)</b>	1.600	.206	.848	.656	1.095
<b>3. Allegation Disposition (Reference Category = Unfounded)</b>	1.404	.496			
a. Allegation Disposition Inconclusive	1.368	.242	1.162	.904	1.493
b. Allegation Disposition Substantiated	.184	.668	1.092	.729	1.637
<b>4. Safety Finding (Reference Category = No Safety Problems Found)</b>	18.674	.000			
a. One Or More Safety Problems + In-Home Safety Intervention	4.586	.032	1.196	1.015	1.409
b. One Or More Safety Problems/ 1+ Children Removed	6.300	.012	.634	.444	.905
<b>5. Post-Investigation Services (Reference category = No Post Investigation Services)</b>	7.703	.006	1.342	1.090	1.652
<b>6. Risk (Reference category = Low Risk)</b>	80.427	.000			
a. Moderate Risk	19.127	.000	1.624	1.307	2.019
b. High/Very High Risk	79.857	.000	3.721	2.789	4.964
<b>7. Risk x Investigation Disposition Interaction (Reference category = Inconclusive Or Unfounded, And/Or Low Risk)</b>	.794	.672			
a. Moderate Risk x Substantiated Investigation	.000	.984	.996	.675	1.470
b. High/Very High Risk x Substantiated Investigation	.422	.516	.864	.557	1.342
<b>Constant</b>	163.583	.000	.103		

## Appendix II

**TABLE 7**

**Risk x Unfounded And Other Variables In Relation To Substantiated Maltreatment Recurrence Within 24 Months Of Initial Referral (In this analysis there were N = 6543 cases closed after the initial investigation, and N = 1142 cases opened for service after the initial investigation, for a total of N = 7685.)**

	Wald Statistic	Statistical Significance	Odds Ratio	95.0% Confidence Interval Boundaries For Odds Ratio	
				Lower	Upper
<b>1. Race Of Primary Caretaker (Reference Category = White)</b>	15.539	.001			
a. African American	.057	.811	1.034	.785	1.363
b. Hispanic	9.074	.003	.797	.688	.924
c. Other/Unknown	8.775	.003	.689	.538	.882
<b>2. Large County Size (Reference Category = Small)</b>	1.117	.291	.870	.673	1.126
<b>3. Allegation Disposition (Reference Category = Unfounded)</b>	6.720	.035			
a. Allegation Disposition Inconclusive	5.859	.015	1.762	1.114	2.788
b. Allegation Disposition Substantiated	3.904	.048	1.612	1.004	2.589
<b>4. Safety Finding (Reference Category = No Safety Problems Found)</b>	19.744	.000			
a. One Or More Safety Problems + In-Home Safety Intervention	4.917	.027	1.202	1.022	1.413
b. One Or More Safety Problems/ 1+ Children Removed	6.402	.011	.632	.443	.902
<b>5. Post-Investigation Services (Reference category = No Post Investigation Services)</b>	7.826	.005	1.343	1.092	1.651
<b>6. Risk (Reference category = Low Risk)</b>	102.492	.000			
a. Moderate Risk	18.721	.000	1.535	1.264	1.864
b. High/Very High Risk	92.054	.000	3.132	2.480	3.954
<b>7. Risk x Investigation Disposition Interaction (Reference category = Inconclusive Or Substantiated, And/Or Low Risk)</b>	9.393	.009			
a. Moderate Risk x Unfounded Investigation	2.445	.118	1.573	.892	2.777
b. High/Very High Risk x Unfounded Investigation	9.393	.002	3.100	1.504	6.392
<b>Constant</b>	109.948	.000	.070		

## Appendix II

**TABLE 8**

**Risk x Small County And Other Variables In Relation To Substantiated Maltreatment Recurrence Within 24 Months Of Initial Referral (In this analysis there were N = 6543 cases closed after the initial investigation, and N = 1142 cases opened for service after the initial investigation, for a total of N = 7685.)**

	Wald Statistic	Statistical Significance	Odds Ratio	95.0% Confidence Interval Boundaries For Odds Ratio	
				Lower	Upper
<b>1. Race Of Primary Caretaker (Reference Category = White)</b>	15.430	.001			
a. African American	.097	.755	1.045	.793	1.376
b. Hispanic	9.254	.002	.796	.687	.922
c. Other/Unknown	8.217	.004	.697	.544	.892
<b>2. Allegation Disposition (Reference Category = Unfounded)</b>	2.383	.304			
a. Allegation Disposition Inconclusive	1.351	.245	1.160	.903	1.491
b. Allegation Disposition Substantiated	.132	.716	1.051	.804	1.374
<b>3. Safety Finding (Reference Category = No Safety Problems Found)</b>	20.597	.000			
a. One Or More Safety Problems + In-Home Safety Intervention	5.187	.023	1.208	1.027	1.422
b. One Or More Safety Problems/ 1+ Children Removed	6.560	.010	.628	.440	.897
<b>4. Post-Investigation Services (Reference category = No Post Investigation Services)</b>	7.260	.007	1.329	1.081	1.634
<b>5. Risk (Reference category = Low Risk)</b>	108.220	.000			
a. Moderate Risk	23.734	.000	1.592	1.320	1.920
b. High/Very High Risk	101.903	.000	3.278	2.603	4.128
<b>6. Small County Size (Reference Category = Large)</b>	2.323	.127	.336	.082	1.366
<b>7. Risk x County Size Interaction (Reference category = Large County, And/Or Low Risk)</b>	4.022	.134			
a. Moderate Risk x Small County	2.808	.094	3.445	.811	14.642
b. High/Very High Risk x Small County	3.824	.051	4.248	.997	18.104
<b>Constant</b>	299.643	.000	.090		

## Appendix II

**TABLE 9**

**Risk x County Participation In CFRA Development Sample And Other Variables In Relation To Substantiated Maltreatment Recurrence Within 24 Months Of Initial Referral (In this analysis there were N = 6543 cases closed after the initial investigation, and N = 1142 cases opened for service after the initial investigation, for a total of N = 7685.**

	Wald Statistic	Statistical Significance	Odds Ratio	95.0% Confidence Interval Boundaries For Odds Ratio	
				Lower	Upper
<b>1. Race Of Primary Caretaker (Reference Category = White)</b>	15.244	.002			
a. African American	.116	.733	1.049	.796	1.382
b. Hispanic	9.151	.002	.797	.687	.923
c. Other/Unknown	8.002	.005	.700	.547	.896
<b>2. Large County Size (Reference Category = Small)</b>	.067	.796	1.059	.688	1.629
<b>3. Allegation Disposition (Reference Category = Unfounded)</b>	2.748	.253			
a. Allegation Disposition Inconclusive	1.651	.199	1.180	.917	1.519
b. Allegation Disposition Substantiated	.201	.654	1.063	.813	1.391
<b>4. Safety Finding (Reference Category = No Safety Problems Found)</b>	20.525	.000			
a. One Or More Safety Problems + In-Home Safety Intervention	5.303	.021	1.211	1.029	1.426
b. One Or More Safety Problems/ 1+ Children Removed	6.382	.012	.632	.443	.902
<b>5. Post-Investigation Services (Reference category = No Post Investigation Services)</b>	7.266	.007	1.329	1.081	1.634
<b>6. Risk (Reference category = Low Risk)</b>	113.410	.000			
a. Moderate Risk	25.298	.000	1.614	1.339	1.944
b. High/Very High Risk	106.564	.000	3.339	2.656	4.198
<b>7. Participation in CFRA Development Sample (Reference Category = Participated)</b>	.373	.541	.629	.142	2.791
<b>8. Risk x Participation in CFRA Development Sample Interaction (Reference category = Participating County, And/Or Low Risk)</b>	1.791	.408			
a. Moderate Risk x Non-participating County	.978	.323	2.129	.476	9.515
a. High/Very High Risk x Non-participating County	1.613	.204	2.629	.592	11.680
<b>Constant</b>	94.002	.000	.083		

## Appendix II

**TABLE 10**

**Risk x Convenience Sample Interaction (first version) And Other Variables In Relation To Substantiated Maltreatment Recurrence Within 24 Months Of Initial Referral (In this analysis there were N = 745 cases closed after the initial investigation, and N = 13 cases opened for service after the initial investigation, for a total of N = 758.)**

	Wald Statistic	Statistical Significance	Odds Ratio	95.0% Confidence Interval Boundaries For Odds Ratio	
				Lower	Upper
<b>1. Race Of Primary Caretaker (Reference Category = White)</b>	10.350	.016			
a. African American	1.570	.210	1.998	.677	5.896
b. Hispanic	4.217	.040	.532	.291	.972
c. Other/Unknown	2.493	.114	.359	.101	1.280
<b>2. Safety Finding (Reference Category = No Safety Problems Found)</b>	.516	.772			
a. One Or More Safety Problems + In-Home Safety Intervention	.420	.517	1.267	.619	2.596
b. One Or More Safety Problems/ 1+ Children Removed	.042	.838	.734	.038	14.339
<b>3. Post-Investigation Services (Reference category = No Post Investigation Services)</b>	2.191	.139	3.136	.690	14.243
<b>4. Risk (Reference category = Low Risk)</b>	11.987	.002			
a. Moderate Risk	3.261	.071	2.108	.938	4.737
b. High/Very High Risk	11.985	.001	7.391	2.382	22.937
<b>5. Near Population Data (Orange County) vs. Convenience Sample (L. A. County) (Reference Category = Near Population Data)</b>	.014	.904	.945	.374	2.385
<b>6. Risk x Convenience Sample Interaction (Reference category = Near Population Data And/Or Low Risk)</b>	.166	.920			
a. Moderate Risk x Convenience Sample County	.082	.775	1.194	.355	4.015
a. High/Very High Risk x Convenience Sample County	.029	.865	.847	.125	5.753
<b>Constant</b>	51.578	.000	.079		

Appendix II

**TABLE 11**

**Risk x Convenience Sample Interaction (second version) And Other Variables In Relation To Substantiated Maltreatment Recurrence Within 24 Months Of Initial Referral (In this analysis there were N = 517 cases closed after the initial investigation, and N = 13 cases opened for service after the initial investigation, for a total of N = 530.)**

	Wald Statistic	Statistical Significance	Odds Ratio	95.0% Confidence Interval Boundaries For Odds Ratio	
				Lower	Upper
<b>1. Race Of Primary Caretaker (Reference Category = White)</b>	3.309	.346			
a. African American	.460	.497	1.766	.341	9.138
b. Hispanic	1.385	.239	.671	.345	1.304
c. Other/Unknown	1.562	.211	.486	.156	1.508
<b>2. Safety Finding (Reference Category = No Safety Problems Found)</b>	.162	.922			
a. One Or More Safety Problems + In-Home Safety Intervention	.019	.889	.953	.483	1.879
b. One Or More Safety Problems/ 1+ Children Removed	.156	.693	.550	.028	10.653
<b>3. Post-Investigation Services (Reference category = No Post Investigation Services)</b>	2.383	.123	3.165	.733	13.665
<b>4. Risk (Reference category = Low Risk)</b>	14.861	.001			
a. Moderate Risk	4.505	.034	2.361	1.068	5.222
b. High/Very High Risk	14.850	.000	8.961	2.938	27.335
<b>5. Near Population Data (Orange County) vs. Convenience Sample (Humboldt, San Luis Obispo, Sutter Counties) (Reference Category = Near Population Data)</b>	.511	.475	1.815	.354	9.297
<b>6. Risk x Convenience Sample Interaction (Reference category = Near Population Data And/Or Low Risk)</b>	.105	.949			
a. Moderate Risk x Convenience Sample County	.105	.746	.736	.116	4.679
a. High/Very High Risk x Convenience Sample County	.055	.815	.782	.100	6.093
<b>Constant</b>	53.507	.000	.069		