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EXECUTIVE SUMMARY

The Applied Research in Child Welfare (ARCH) Project is a partnership between Colorado State University (CSU), the Colorado Department of Human Services (CDHS), and the Departments of Human/Social Services in Adams, Arapahoe, Boulder, Broomfield, Denver, Douglas, El Paso, Jefferson, Larimer, and Pueblo counties. This report presents results from a predictive study of family preservation outcomes and child welfare success, which was conducted by the Social Work Research Center in the School of Social Work at CSU with funding from the ARCH Project.

This study emerged from a long-held interest by the 10 ARCH counties to define and understand child welfare success more holistically. The principles of family preservation were used as the basis of measuring child welfare success in the study. The family preservation services model is built upon the primary belief that most children can be safely protected and treated within their own homes when parents are provided with services and support and are empowered to change their lives. The resulting child welfare success scoring methodology utilized in this study was developed from the family preservation core principles of maintaining children with their families or reunifying children with their parents, whenever it can be done safely.

The focus of this study is to assist caseworkers and supervisors to plan for and effectively engage families so they can achieve success in the child welfare system. To accomplish this, the counties have conceptualized a predictive model to represent the interplay between client/case characteristics, agency/community structure, interventions/services, and other child welfare events.
This study employed an associational research design to explore the relationship between a composite measure of child welfare success, family and risk characteristics, and presenting issues. To be included in the study, a case had to be closed between 10/1/2007 and 9/30/2009 and opened for at least 60 days. To allow for more appropriate modeling of child welfare success, the eligible cases were divided into two groups based on program area. This report details the findings from the Program Area 5 (abuse or neglect) sample and a future report will focus on the findings from the Program Area 4 (youth beyond control of parent or delinquent youth) sample. The final Program Area 5 sample was comprised of 4,589 non-duplicated cases.

Originally, the study included a very large list of possible predictor, explanatory, and outcome variables. To make the findings more practically significant, a process was undertaken to identify the most essential variables to include in a predictive model. This process was based on the literature, professional judgment, and existing measures of child welfare success. We decided to drop the explanatory variables from the final model when it was determined that the placement and Core Services data could not reliably or validly be used to explain the differences between cases on child welfare success. Another key decision in the variable selection was to only use the total score and score level variables from the Colorado Risk and Safety Assessments rather than data from each of the individual items. However, data from individual items were used in the creation of proxy predictor variables to measure risk and presenting issues more globally. Ultimately, the larger list was collapsed into a manageable set of 20 predictor variables which were used for the analyses.
Two categories of outcomes were used in the study to measure the overall success of a child welfare case: (1) permanency at case closure and (2) subsequent involvement of the family within one year of case closure. The variables selected for the permanency and follow-up outcomes, as well as their respective composite outcome score values, were established using family preservation principles. The primary measure of child welfare success utilized in the study was a composite outcome variable in which permanency outcomes (remain home, reunification, relative/guardianship, adoption, termination of parental rights, emancipation/long-term foster care) and follow-up outcomes (subsequent referral, assessment, case, founded assessment, and removal) were combined to create an overall composite outcome score. The composite outcome was designed to measure child welfare success from a child’s perspective.

To arrive at the composite outcome score, the permanency and follow-up outcome events were each assigned a numeric point value based on expert ratings of their positive or negative impact on child welfare success. Although the total outcome score represented the composite outcome variable well, it violated the “normality” assumption which is required for a standard regression analysis. Because the total scores were not suitable for analysis, we combined these total scores into score levels, according to their value. The statistical model used for analysis is called a cumulative logit model with proportional odds assumption. A “variable selection” algorithm was used to identify which subset of the entire group of predictor variables had the highest correlation (or explained the most variation) with the score level outcome. The results of such a model are expressed in terms of odds ratios.
For the overall model of child welfare success for Program Area 5 cases, we chose to work with the best six predictor variables, because it is a practical number of factors that can be reasonably considered by caseworkers when working with a family. The “best six” predictor variables for the composite score level outcome were:

1. number of caregivers
2. neglect risk level from the Colorado Risk assessment
3. poverty presenting issue
4. abuse risk level from the Colorado Risk Assessment
5. age of primary caregiver
6. substance abuse presenting issue

These results tell us that on average, a case with two caregivers is about twice as likely (or 100% more likely) to have a successful outcome than a case with one caregiver. A case where the risk of neglect is low or moderate is almost 1.7 times as likely (70% more likely) to have a successful outcome than a case where the risk of neglect is high. Similarly, a case with no poverty presenting issue is about 1.6 times as likely (60% more likely) to have a successful outcome than a case with poverty presenting issue. A case where the risk of abuse is low or moderate is 1.5 times as likely (50% more likely) to have a successful outcome than a case where the risk of abuse is high. A case where the primary caregiver is age 26 or older is about 1.4 times as likely (40% more likely) to have a successful outcome than a case where the primary caregiver is age 25 or younger. Finally, a case with no substance abuse presenting issue is about 1.2 times as likely (20% more likely) to have a successful outcome than a case where there is a substance abuse presenting issue.

The most successful child welfare case was defined as one where children remain with or return home to their parents and have no subsequent involvement with
the child welfare system. However, success is on a continuum and there are numerous pathways to achieving a successful outcome from the child’s perspective. According to the findings, four out of every five cases ended with children remaining home, returning home, or living with relatives or in guardianship and having little to no subsequent involvement. Thus, cases in the current study were four times more likely to be successful than unsuccessful. Unfortunately, the study design and available data did not support the identification of specific services or a combination of services that were related to child welfare success.

Perhaps the most notable limitation of this study is the lack of predictor and explanatory variables available in Colorado Trails. There are no measures of employment and education and no true measures of poverty and mental health problems. There is limited data available on the presenting needs of children and families at the time of involvement with the child welfare system. There also is a lack of explanatory variables, as there are few available measures of family supports, family engagement, and family meetings. The nature of Core Services data documentation and tracking is another important limitation to consider. The constraints of these data include variability in how services are recorded in different counties, diversity in the types of county-designed services offered, and inability to quantify service participation. A final limitation is that an associational research design can only yield information regarding correlation and not causation. This is an important point to emphasize when disseminating this study so that practitioners and policymakers are able to apply the findings within the proper context.
The study reveals that, of the predictive variables analyzed, the most significant predictor of child welfare success is when children have two caregivers in the home. An implication of this finding is that if caseworkers can provide support services that "mimic" the presence of two caregivers, a family with one caregiver could improve its likelihood of child welfare success. Not surprisingly, poverty was a strong predictor of child welfare success. Many practitioners believe that poverty is a root cause of child maltreatment and have petitioned for alternative ways to provide families with financial assistance, stable housing, educational support, and employment training. The inclusion of risk neglect level and risk abuse level in the list of the six most powerful predictors adds a measure of confidence that the assessment tools are meaningful and informative resources for case planning. This finding also has implications for outcomes, in that spending resources to promote change in specific dynamic items on the risk assessment could improve the odds of child welfare success.

From a policy perspective, the Colorado Safety and Risk Assessments should be enhanced by adding descriptive indicators that can be used in future evaluations, as they are otherwise not readily available in Colorado Trails. A validation study of the assessments also is recommended. Implications for child welfare practitioners would be to increase the level of funding and availability of appropriate treatment options for those risk factors or presenting issues that emerged as significant predictors of child welfare success. A randomized control design is needed to answer the question of what type of Core Services package yields the greatest likelihood of success. Lastly, there is a clear need for further model development and for research related to predicting family preservation outcomes and child welfare success.
INTRODUCTION

The Applied Research in Child Welfare (ARCH) Project is a partnership between Colorado State University (CSU), the Colorado Department of Human Services (CDHS), and the Departments of Human/Social Services in Adams, Arapahoe, Boulder, Broomfield, Denver, Douglas, El Paso, Jefferson, Larimer, and Pueblo counties. The purpose of the ARCH Project is to conduct applied research on child welfare interventions that informs social work practice and policy in Colorado. This report presents results from a predictive study of family preservation outcomes and child welfare success, which was conducted by the Social Work Research Center in the School of Social Work at CSU with funding from the ARCH Project.

Rationale

This study emerged from a long-held interest by the 10 ARCH counties to define and understand child welfare success more holistically. The principles of family preservation were used as the basis of measuring child welfare success in the study. The family preservation services model is built upon the primary belief that most children can be safely protected and treated within their own homes when parents are provided with services and support and are empowered to change their lives. The resulting child welfare success scoring methodology utilized in this study was developed from the family preservation core principles of maintaining children with their families or reunifying children with their parents, whenever it can be done safely.

The focus of this study is to assist caseworkers and supervisors to plan for and effectively engage families so they can achieve success in the child welfare system. To accomplish this, the counties have conceptualized a predictive model to represent the
interplay between client/case characteristics, agency/community structure, interventions/services, and other child welfare events.

**Research Questions**

This study was designed to address the following research questions:

1. What is a successful child welfare case?
2. What are the predictors of a successful child welfare case?
3. Are there specific services and placements or a combination of services and placements that are related to child welfare success?

Although the purpose of this study was to determine which predictor variables (i.e., case and risk characteristics, presenting issues) were most associated with child welfare success, the study also was intended to determine if explanatory variables (i.e., services, placements) could explain why cases with similar predictor variables have different levels of child welfare success. Unfortunately, with observational data and a context where services and placements had already occurred, there was an inability to study the causal effects of the explanatory variables. Thus, this report only presents the findings for the first two research questions. However, using predictor variables allows us to understand what type of child welfare cases are associated with positive child welfare outcomes. This knowledge will hopefully assist county and state agencies in advocating for more effective child welfare policy and enhancing practice to improve effectiveness in attaining positive child welfare outcomes.

**LITERATURE REVIEW**

The review of the literature explores the use of predictive modeling in child welfare and the relationship between predictor variables and child welfare outcomes.
Predictive Modeling in Child Welfare

Predictive modeling in child welfare seeks to identify case characteristics that are predictive of the likelihood of future maltreatment. For example, Proctor, Van Dusen Randazzo, Litrownik, Newton, Davis, and Villodas (2011) utilized a regression analysis to determine which variables best predicted placement stability. This study revealed that involvement of a father figure, family functioning, and child functioning were significant predictor variables (Proctor et al., 2011). In a study by Cheng (2010), predictive modeling was used to explore the likelihood of exit to reunification or adoption for children in long-term foster care. Findings suggested that caseworker engagement, risk for subsequent maltreatment, and need for parental substance abuse treatment were significant predictors (Cheng, 2010). In a logistic regression study, Brown, Cohen, Johnson, and Salzinger (1998) identified maternal youth, single parent, and welfare dependence as risk factors associated with physical abuse, and low income, maternal youth, single parent, and welfare dependence associated with child neglect. In another predictive modeling study, Rittner (2002) found that past histories as victims of abuse, substance abuse, mental health problems, and poverty were associated with recurrence of child abuse or neglect. Additionally, persistent efforts have been made to generate empirical support for the predictive ability of risk assessment instruments in child welfare (Rittner, 2002). Overall, these tools have been shown to be powerful predictors for a variety of case outcomes (Sicoly, 1989).

Predictor Variables

The predictive model in the present study found several variables to be significant predictors of child welfare outcomes. These variables include number of
caregivers in the home, caregiver age, substance abuse, poverty, and risk of abuse and neglect. Based on the literature, these variables are explored with respect to their significance and influence on child welfare outcomes.

The number of caregivers in a family has received empirical support as a predictor of maltreatment recurrence. In general, the literature indicates that children from two-parent households tend to reunify faster than do children from other family structures (Courtney, 1994; Shaw, 2010, Wells & Guo, 1999). Studies have found that single parent families experience lower rates of reunification (McDonald, Poertner, & Jennings, 2007; Rockhill, Green, & Furrer, 2007; Wells & Guo, 1999) and permanency (Yampolskaya, Armstrong, & Vargo, 2007) than do other family structures. Furthermore, children living in single-parent homes appear to be at greater risk of foster care reentry (Shaw, 2006; Wulczyn, 2004) and maltreatment recurrence (Fuller, 2005; Fuller, Wells, & Cotton, 2001), while being less likely to exit foster care (Glisson, Bailey, & Post, 2000). Wilson, Daly, and Weghorst (1980) found that father-only households had higher levels of risk for both abuse and neglect than did two-parent homes. In a study using predictive modeling, Zuravin, Benedict, and Somerfield (1993) found that homes with single parents were 2.3 to 2.7 times more likely to maltreat as compared to homes with married couples.

The research on the relationship between caregiver age and child welfare outcomes is scarce. According to one study, children with younger caregivers were less likely to reunify than were children with older caregivers (Fraser, Walton, Lewis, Pecora, & Walton, 1996). In another study, Davis, Landsverk, and Newton (1997) found that children removed from homes with older mothers reunified at higher rates than did
children removed from homes with younger mothers. Using predictive modeling, Zuravin et al. (1993) found that for every one year increase in maternal age, the likelihood of maltreatment decreased by four percent.

Parental substance abuse issues have been commonly identified by child protective service professionals as the single variable most predictive of recurrence of child abuse (Rittner, 2002). Many studies have determined substance abuse to be one of the decisive factors effecting reunification and reentry of children (Frame, Berrick, & Brodowski, 2000; Hohman & Butt, 2001; Jones, 1998; Maluccio & Ainsworth, 2003; Terling, 1999). Research has found that children with substance abusing parents experience lower rates of reunification (McDonald, et al., 2007; Rosenberg & Robinson, 2004; Shaw, 2010). For example, Smith (2003) found that cases involving parental substance abuse experience a 57 percent lower rate of reunification than do cases without substance abuse. Snowden, Leon, and Sieracki (2008) concluded that parental substance abuse was associated with a decreased likelihood of adoption. The research also suggests that parental substance abuse is associated with an increased risk of reentry to care (Brook & McDonald, 2009; English, Marshall, Brummel, & Orme, 1999; Frame et al., 2000; Miller, Fisher, Fetrow, & Jordan, 2006; Terling, 1999). For example, Shaw (2006) found that cases where drug or alcohol services were recommended as part of the treatment plan were more than twice as likely to experience reentry. Lastly, parental substance abuse problems have been correlated with higher subsequent maltreatment rates (Connell, Bergeron, Katz, Saunders, & Tebes, 2007; Guo, Barth, & Gibbons, 2006; Littell & Schuerman, 2002; Miller et al., 2006).
According to the literature, poverty increases a child’s likelihood of negative placement and permanency outcomes (Courtney & Wong, 1996; Potter & Klein-Rothschild, 2002; Smith, 2003; Wells & Guo, 1999). Courtney (1995) found that receipt of Aid to Families with Dependent Children (AFDC) was more strongly correlated with unsuccessful reunification than any other factor. Shaw (2010) reported that families eligible for Title IV-E services had a decreased probability of reunification. Jones (1998) found that poverty was the strongest predictor of successful reunification. Lower rates of reunification or adoption have been reported for children from families receiving public cash assistance (Courtney, 1994; Courtney & Wong, 1996). Several studies have indicated that children living in poverty are at a greater risk of reentry to care (Courtney, 1995; Frame et al., 2000; Jones, 1998; Jonson-Reid, 2003; Shaw, 2006). Additionally, Kahn and Schwalbe (2010) found that a small number of risk factors, including poverty, predicted child maltreatment recurrence.

Although the research indicates that the experience of child abuse or neglect reduces the likelihood of reunification (Goerge, 1990; Wells & Guo, 1999), it is less clear on the impact of maltreatment type on child welfare outcomes. Barber, Delfabbro, and Cooper (2001) found that child neglect resulted in an almost five times greater likelihood of a successful outcome than other forms of maltreatment. More specifically, neglect appears to be associated with lower reunification rates (Barber & Delfabbro, 2009; Bundy-Fazioli, Winokur, & DeLong-Hamilton, 2009; Courtney, 1994; Davis et al., 1997; Wells & Guo, 1999). However, Cheng (2010) found neglect to be a significant predictor of the probability of reunification. Similarly, other researchers have found that children removed for neglect experience higher rates of reunification than do children removed
for abuse (Goerge, 1990; Harris & Courtney, 2003). Neglect has been consistently associated with an increased rate of maltreatment recurrence as compared to other maltreatment types (Connell et al., 2007; DePanfilis & Zuravin, 1999; Drake, Jonson-Reid, & Sapokaite, 2006; Jonson-Reid, 2003; Lipien & Forthofer, 2004). The literature also suggests that children placed in care due to neglect have higher rates of reentry than do children placed because of abuse (Jones, 1998; Miller et al., 2006).

For abuse as a potential risk predictor variable, Thompson and Wiley (2009) found that maltreatment type significantly predicted risk, as physically or sexually abused children were almost five times more likely to be re-referred than were children without a history of abuse. Terling (1999) reported greater risk of reentry for physically abused children, while Wells and Guo (1999) found lower risk of reentry for physically abused children. While Jonson-Reid (2003) reported lower risk of reentry among neglected children, Shaw (2006) reported lower risk among sexually abused children.

METHODS

This study employed an associational research design to explore the relationship between a composite measure of child welfare success, family and risk characteristics, and presenting issues. The study parameters, sample selection, variable selection, variable definitions, data collection techniques, and data analysis procedures are described in the methods section.

Study Parameters

The following are the parameters that guided the sample selection and data collection for the study. To be included in the study, a case had to meet the following requirements:
Data Collection

Data for this study were collected from individual case records entered into Colorado Trails, which is Colorado’s Statewide Automated Child Welfare Information System (SACWIS). Colorado Trails is an online data management and analysis system used for child welfare case management documentation and was used as the only source of predictor, explanatory, and outcome variables for this study. Individual case records include data from the Colorado Safety and Risk Assessments (see Appendix B and C). The data were transmitted in Excel spreadsheets to the Social Work Research Center with the unique child identifiers removed.

Sample Selection

To allow for more appropriate modeling of child welfare success, the eligible cases were divided into two groups based on program area. This report details the findings from the Program Area 5 (abuse or neglect) sample and a future report will focus on the findings from the Program Area 4 (youth beyond control of parent or delinquent youth) sample. The accessible sample was drawn from cases that met the

1. Case was closed between 10/1/2007 and 9/30/2009.

2. Case was assigned as primary to one of the 10 ARCH counties at time of closure.

3. Case had to involve a child who was Program Area 5 at some point during the case involvement span.

4. Case was opened for at least 60 days.

5. Case did not have a child with a previous finalized adoption.

6. Case had to be opened from a Colorado Trails referral/assessment. This rule allowed us to capture key data elements from the Colorado Risk and Safety Assessments used in the study.
aforementioned study parameters. The selected sample included children and youth ages 0-21 that were under delinquency and/or dependency and neglect court actions or were diverted from court action through voluntary service participation. The final Program Area 5 (PA5) sample was comprised of 4,589 non-duplicated cases.

Some cases were excluded from the original sample due to missing values for key study variables. Cases that were missing predictor, explanatory, or outcome variables selected for the final model were removed from the study because regression analysis requires complete data on all variables for each case. Specifically, cases missing child ethnicity, number of caregivers, primary caregiver age, child age, placement data, service data, permanency, and follow-up outcomes were removed from the sample. Furthermore, cases in which the Colorado Safety and Risk Assessments were either not completed or were incomplete according to Colorado Trails were excluded from the study. Ultimately, 1,090 cases, or 19% of the original sample of 5,679 were excluded from the study.

**Variable Selection**

Originally, the study included a very large list of possible predictor, explanatory, and outcome variables. To make the findings more practically significant, a process was undertaken to identify the most essential variables to include in a predictive model. This process was based on the literature, professional judgment, and existing measures of child welfare success. We decided to drop the explanatory variables from the final model when it was determined that the placement and Core Services data could not reliably or validly be used to explain the differences between cases on child welfare success. Additionally, data from the North Carolina Family Assessment Scale (NCFAS)
variables were removed because of significant missing data. Another key decision in the variable selection was to only use the total score and score level variables from the Colorado Safety and Risk Assessments rather than data from each of the individual items. However, data from the individual items were used in the creation of proxy predictor variables to measure risk and presenting issues more globally. Ultimately, the larger list was collapsed into a manageable set of 20 predictor variables which were used for the analyses.

**Variable Definitions**

To allow for easier and more consistent interpretation of the analysis, the predictor variables were defined dichotomously. The predictor variables included in the final model were defined as follows:

1. **Number of children** – the number of PA5 children in the family defined as either two or fewer or three or more.

2. **Ethnicity of youngest child** – primary ethnicity of youngest child in case defined as either Caucasian or non-Caucasian. Thus, if the child had a designation of Native American, Asian, African American, Hispanic, Alaskan Native, Native Hawaiian, Pacific Islander, or East Indian, he or she was considered to be non-Caucasian.

3. **Number of caregivers** – the number of caregivers in the family defined as either one caregiver or two caregivers. This variable was established using two different approaches: (1) for cases in which there was an out-of-home placement, the "Family Structure" field from the Colorado Trails “Removal” window was used. The following family structure values represented one caretaker: single male and single female. The following family structure values represented two caretakers: married couple and unmarried couple; and (2) for cases in which there was not an out-of-home placement, Question A10 (secondary caregiver has a substance abuse problem) from the Colorado Risk Assessment was used to determine whether a case had one or two caretakers, because there is not a specific field available in Colorado Trails to identify the family structure for non out-of-home cases. If the response to this question was "N/A - no secondary caregiver," the case was determined to have one caretaker. Cases that had any other response to this question were coded as having two caretakers.
4. **Age of primary caregiver** – the age of the primary caregiver in the family at case opening defined as either 25 and younger or 26 and older.

5. **Founded allegation** – defined as an allegation involving any of the PA5 children in the case that was founded.

6. **Prior referral** – defined as a prior referral (before the current case) involving any of the PA5 children in the case.

7. **Prior assessment** – defined as a prior assessment involving any of the PA5 children in the case.

8. **Prior founded assessment** – defined as a prior founded assessment involving any of the PA5 children in the case.

9. **Prior case** – defined as a prior case involvement involving any of the PA5 children in the case.

10. **Prior removal** – defined as a prior removal from home involving any of the PA5 children in the case.

11. **Caregiver history of abuse** – defined as a case having a “yes” for Question A3 (history of abuse or neglect as a child for the primary caregiver) on the abuse domain of the Colorado Risk Assessment.

12. **Physical abuse presenting issue** – defined as any allegation of physical abuse, or a case having a “yes” on Question A6 (excessive/inappropriate discipline) on the abuse domain of the Colorado Risk Assessment, or a case having a “yes” for Question 1 (caregiver in the home out-of-control or violent) of the Colorado Safety Assessment.

13. **Sexual abuse presenting issue** – defined as any allegation of sexual abuse, or a case having a “yes” on Question 12 (child sexual abuse is suspected) of the Colorado Safety Assessment.

14. **Lack of supervision presenting issue** – defined as a case having a “yes” on Question N7 (physical care or supervision inconsistent with child’s needs) on the neglect domain of the Colorado Risk Assessment, or a “yes” on Question A5 (supervision inconsistent with child’s needs) on the abuse domain of the Colorado Risk Assessment, or a “yes” on Question 8 (insufficient supervision to protect child from harm) on the Colorado Safety Assessment.

15. **Substance abuse presenting issue** – defined as a case having a “yes” on Question N8 (primary caregiver has a substance abuse problem) on the neglect domain of the Colorado Risk Assessment, or a “yes” on Question A10
(secondary caregiver has a substance abuse problem) on the abuse domain of the Colorado Risk Assessment, or a “yes” on Question 11 (caregivers substance abuse may seriously affect ability to care for children) on the Colorado Safety Assessment.

16. **Mental health presenting issue** – defined as a case having a “yes” on Question A9 (caregivers have a history of mental health treatment) on the abuse domain of the Colorado Risk Assessment, or a “yes” on Question 13 (caregivers emotional instability) on the Colorado Safety Assessment.

17. **Domestic violence presenting issue** – defined as a case having a “yes” on Question N10 (history of domestic violence in the household) on the neglect domain of the Colorado Risk Assessment, or a “yes” on Question A7 (disruptive/volatile adult relationships) on the abuse domain of the Colorado Risk Assessment, or a “yes” on Question 14 (domestic violence places child in danger of physical or emotional harm) on the Colorado Safety Assessment.

18. **Poverty presenting issue** – defined as a case having a “yes” on Question N11 (caregivers have history of homelessness) on the neglect domain of the Colorado Risk Assessment, or a “yes” on Question 6 (caregiver is unwilling or unable to meet the child’s basic needs) on the Colorado Safety Assessment.

19. **Risk neglect level** – defined as low/moderate or high risk level on the neglect domain of the Colorado Risk Assessment.

20. **Risk abuse level** – defined as low/moderate or high risk level on the abuse domain of the Colorado Risk Assessment.

**Outcome Definitions**

Two categories of outcomes were used in the study to measure the overall success of a child welfare case: (1) permanency at case closure or “Permanency Outcomes” and (2) subsequent involvement of the family within one year of case closure or “Follow-up Outcomes.” Additionally, specific outcome measures were defined within each outcome category. The variables selected for the permanency and follow-up outcomes, as well as their respective composite outcome score values, were established using family preservation principles. The specific outcome measures within each outcome category are defined below:
Permanency Outcomes

1. **Remain home** – how many PA5 children in the family had remained home by the end of the case.

2. **Return home** – how many PA5 children in the family that were in placement had returned home by the end of the case.

3. **Relative/Guardianship** – how many PA5 children in the family that were in placement had a permanent allocation of parental rights (APR) or guardianship with relatives by the end of the case.

4. **Adoption** – how many PA5 children in the family that were in placement had been adopted by the end of the case.

5. **Termination of parental rights** – how many PA5 children in the family had a termination of parental rights (TPR) by the end of the case.

6. **Emancipation/Long-term foster care** – how many PA5 children in the family were emancipated or in long-term foster care by the end of the case.

Follow-up Outcomes

1. **Subsequent referral** – how many PA5 children in the family had a referral within one year of case closure.

2. **Subsequent assessment** – how many PA5 children in the family had an assessment within one year of case closure.

3. **Subsequent founded assessment** – how many PA5 children in the family had a founded assessment within one year of case closure.

4. **Subsequent case** – how many PA5 children in the family had a new case involvement within one year of case closure.

5. **Subsequent removal** – how many PA5 children in the family had a removal from home within one year of case closure.

Composite Outcome

The primary measure of child welfare success utilized in the study was a composite outcome variable in which permanency outcomes and follow-up outcomes were combined to create an overall composite outcome score. The composite outcome
was designed to measure child welfare success from a child’s perspective. The case level was selected as the unit of analysis rather than the child level because the overall success of a case rests on how all children in the family fare rather than just one child. However, each child’s outcomes are accounted for in determining the overall success of a case.

To arrive at the composite outcome score, the permanency outcome events were each assigned a numeric point value based on expert ratings of their positive or negative impact on child welfare success. As displayed in Table 1, these point values range from a +5 for the most positive permanency outcome of remain home to a -3 for the least positive outcome of emancipation or long-term foster care (LTFC).

<table>
<thead>
<tr>
<th>Permanency Event</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parents – Remain Home</td>
<td>+5</td>
</tr>
<tr>
<td>Parents – Return Home</td>
<td>+4</td>
</tr>
<tr>
<td>Relative/Guardianship</td>
<td>+3</td>
</tr>
<tr>
<td>Adoption</td>
<td>+2</td>
</tr>
<tr>
<td>TPR</td>
<td>-2</td>
</tr>
<tr>
<td>Emancipation/LTFC</td>
<td>-3</td>
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</tbody>
</table>

After the point system had been defined for each permanency event, each of the follow-up events was assigned a numeric point value based on expert ratings of their severity or impact level. As displayed in Table 2, the point values for the follow-up outcomes range from a -1 for the least negative follow-up outcomes of subsequent referral, assessment, or case to a -2 for the most negative outcomes of subsequent founded assessment and subsequent removal from home.
Table 2

Point Values for Follow-up Outcome Events

<table>
<thead>
<tr>
<th>Event</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subsequent Referral</td>
<td>-1</td>
</tr>
<tr>
<td>Subsequent Assessment</td>
<td>-1</td>
</tr>
<tr>
<td>Subsequent Case</td>
<td>-1</td>
</tr>
<tr>
<td>Subsequent Founded Assessment</td>
<td>-2</td>
</tr>
<tr>
<td>Subsequent Removal</td>
<td>-2</td>
</tr>
</tbody>
</table>

The follow-up outcome score was computed by adding the point values of each follow-up event that occurred within one year of closure. For example, if a closed case had a subsequent referral which was accepted for assessment, and then opened to an in-home case (unfounded) within one year, the combined follow-up score would be -3 (-1 for a subsequent referral, -1 for a subsequent assessment, and -1 for a subsequent case). Multiple occurrences of the same follow-up event that occurred within one year of closure were only counted once (i.e. if a case had two subsequent referrals within one year, the follow-up score would be -1 not -2).

After assigning points for each of the permanency and follow-up events, each event was then multiplied by the percentage of children in the case who experienced that outcome. For example, remaining home with parents is worth 5 points. If two children out of three remain home, then that event receives a score of $5 \times \frac{2}{3} = 3.3$.

Here is an example of a total score calculation. Assume that family A has three children. Two remain home (5 points) and one is removed but returns home (4 points). One year later, one child has a subsequent assessment (-1 point). Thus, the family’s total score is: $5 \times \frac{2}{3} + 4 \times \frac{1}{3} + (-1) \times \frac{1}{3} = 4.3$. 

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Although the total outcome score represented the composite outcome variable well, it violated the “normality” assumption which is required for a standard regression analysis. As displayed in Figure 1, instead of being normally distributed like a bell curve, the total score is negatively skewed. This means there are many more total scores which are very high (i.e. close to or equal to 5) than there are scores which are very low.

Figure 1

*Distribution of Total Outcome Score*

If the normality assumption were not violated, a multiple regression analysis could have been conducted to determine which predictor variables were most correlated with the total score. A square root transformation of the data was examined, but this did not remove the skewness so as to allow for this type of regression approach. Because the total scores were not suitable for analysis, we combined these total scores into score *levels*, according to their value. The score levels were calculated as follows:
If total score <= 0, then level = 1
If total score > 0 and total score < 3, then level=2
If total score => 3 and total score < 4, then level=3
If total score => 4 and total score <5, then level=4
If total score => 5, then level=5

As a result, each family in the study received an outcome score level of 1, 2, 3, 4 or 5 based on the originally calculated total score. The outcome score level represents the composite outcome variable used in the study. As displayed in Table 3, there was a good distribution of cases across the five score levels with 25.8% of cases at level 5, 21.4% at level 4, 18.8% at level 3, 14.5% at level 2, and 19.6% at level 1.

Table 3
Score Level Distribution for PA5 Sample (N = 4,589)

<table>
<thead>
<tr>
<th>Score Level</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>898</td>
<td>19.6</td>
</tr>
<tr>
<td>2</td>
<td>666</td>
<td>14.5</td>
</tr>
<tr>
<td>3</td>
<td>861</td>
<td>18.8</td>
</tr>
<tr>
<td>4</td>
<td>981</td>
<td>21.4</td>
</tr>
<tr>
<td>5</td>
<td>1,183</td>
<td>25.8</td>
</tr>
</tbody>
</table>

Data Analysis

The predictor, explanatory, and outcome data were first entered into the Statistical Package for Social Sciences (SPSS), checked for missing and incorrect data, and recoded into the appropriate variables. Descriptive statistics were generated for the predictor variables to describe the case and risk characteristics for cases in the sample. The data were then imported from SPSS into the SAS/STAT software package (version 9.2) to conduct further analyses. The LOGISTIC procedure was used to fit a cumulative logit model to the data. Further details regarding the model are provided below.
The statistical model used for analysis is called a cumulative logit model with proportional odds assumption (Agresti, 2007). The cumulative logit model is appropriate for an ordinal outcome, such as the score level variable. A “variable selection” algorithm was used to identify which subset of the entire group of predictor variables had the highest correlation (or explained the most variation) with the score level outcome. We chose to work with the best six predictor variables, because it is a practical number of factors that can be reasonably considered by caseworkers when working with a family. The results of such a model are expressed in terms of odds ratios. Further detail about odds ratios is provided in the “Results” section.

In addition to the cumulative logit model, three sub-analyses were conducted to investigate which variables best predicted discrete follow-up child welfare outcomes. Specifically, logistic predictive models were generated for subsequent founded assessment, subsequent case involvement, and subsequent removal from home. In addition, one sub-analysis was conducted to explore which variables best predicted termination of parental rights. These models also express their results in terms of odds ratios.

**DESCRIPTIVE RESULTS**

In this section, the case characteristics, risk characteristics, and presenting issues of the PA5 sample are presented along with the overall permanency and follow-up outcome results.

As displayed in Table 4, the PA5 sample was comprised of 4,589 cases from the 10 ARCH counties. The county with the most cases was Denver at 18.7%, followed by El Paso at 16.6%, and Adams at 14.2%. 
The case characteristics for the PA5 sample are displayed in Table 5. For number of children, 72.5% of the cases in the PA5 sample had two or fewer children while 27.5% had three or more children. For ethnicity of youngest child, 51.0% of the cases were categorized as non-Caucasian while 49.0% were categorized as Caucasian. For number of caregivers, 60.2% of the cases had two caregivers while 39.8% had one caregiver. Lastly, 69.5% of the cases had a primary caregiver who was 26 or older while 30.5% had a primary caregiver who was 25 or younger. Overall, 61.1% of the cases had a founded allegation while 38.9% did not have a founded allegation.
Table 5

*Case Characteristics for PA5 Sample (N = 4,589)*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of Children</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two or Fewer</td>
<td>3,325</td>
<td>72.5</td>
</tr>
<tr>
<td>Three or More</td>
<td>1,264</td>
<td>27.5</td>
</tr>
<tr>
<td><strong>Ethnicity of Youngest Child</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>2,250</td>
<td>49.0</td>
</tr>
<tr>
<td>Non-Caucasian</td>
<td>2,339</td>
<td>51.0</td>
</tr>
<tr>
<td><strong>Number of Caregivers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One Caregiver</td>
<td>1,826</td>
<td>39.8</td>
</tr>
<tr>
<td>Two Caregiver</td>
<td>2,763</td>
<td>60.2</td>
</tr>
<tr>
<td><strong>Age of Primary Caregiver</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25 and Younger</td>
<td>1,399</td>
<td>30.5</td>
</tr>
<tr>
<td>26 and Older</td>
<td>3,190</td>
<td>69.5</td>
</tr>
<tr>
<td><strong>Founded Allegation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2,802</td>
<td>61.1</td>
</tr>
<tr>
<td>No</td>
<td>1,787</td>
<td>38.9</td>
</tr>
</tbody>
</table>

The risk characteristics for the PA5 sample are displayed in Table 6. The most frequent type of prior involvement was prior referral at 65.0%, followed by prior assessment at 57.4%, prior case involvement at 30.7%, prior founded assessment at 21.9%, and prior removal at 10.6%. For caregiver history, 28.3% of cases had a caregiver with a history of abuse as a child while 71.7% of cases did not have a caregiver with a history of abuse. For the risk level variables, 75.3% of cases were rated as low/moderate risk for abuse while 68.5% of cases were rated as low/moderate for neglect.
Table 6

*Risk Characteristics for PA5 Sample (N = 4,589)*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior Referral</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2,981</td>
<td>65.0</td>
</tr>
<tr>
<td>No</td>
<td>1,608</td>
<td>35.0</td>
</tr>
<tr>
<td>Prior Assessment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2,636</td>
<td>57.4</td>
</tr>
<tr>
<td>No</td>
<td>1,953</td>
<td>42.6</td>
</tr>
<tr>
<td>Prior Founded Assessment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1,004</td>
<td>21.9</td>
</tr>
<tr>
<td>No</td>
<td>3,585</td>
<td>78.1</td>
</tr>
<tr>
<td>Prior Case Involvement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1,410</td>
<td>30.7</td>
</tr>
<tr>
<td>No</td>
<td>3,179</td>
<td>69.3</td>
</tr>
<tr>
<td>Prior Removal from Home</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>486</td>
<td>10.6</td>
</tr>
<tr>
<td>No</td>
<td>4,103</td>
<td>89.4</td>
</tr>
<tr>
<td>Caregiver History of Abuse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1,299</td>
<td>28.3</td>
</tr>
<tr>
<td>No</td>
<td>3,290</td>
<td>71.7</td>
</tr>
<tr>
<td>Risk Abuse Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low/Moderate</td>
<td>3,457</td>
<td>75.3</td>
</tr>
<tr>
<td>High</td>
<td>1,132</td>
<td>24.7</td>
</tr>
<tr>
<td>Risk Neglect Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low/Moderate</td>
<td>3,145</td>
<td>68.5</td>
</tr>
<tr>
<td>High</td>
<td>1,444</td>
<td>31.5</td>
</tr>
</tbody>
</table>

The presenting issues proxy variables are displayed in Table 7. Overall, 54.5% of cases had a mental health presenting issue, 53.8% had a substance abuse presenting issue, 46.9% had a domestic violence presenting issue, 35.0% had a lack of supervision presenting issue, 29.3% had a poverty presenting issue, and 9.8% had a sexual abuse presenting issue.
Table 7

Presenting Issues for PA5 Sample (N = 4,589)

<table>
<thead>
<tr>
<th>Presenting Issue</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Abuse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1,387</td>
<td>30.2</td>
</tr>
<tr>
<td>No</td>
<td>3,202</td>
<td>69.8</td>
</tr>
<tr>
<td>Sexual Abuse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>448</td>
<td>9.8</td>
</tr>
<tr>
<td>No</td>
<td>4,141</td>
<td>90.2</td>
</tr>
<tr>
<td>Lack of Supervision</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1,604</td>
<td>35.0</td>
</tr>
<tr>
<td>No</td>
<td>2,985</td>
<td>65.0</td>
</tr>
<tr>
<td>Substance Abuse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2,468</td>
<td>53.8</td>
</tr>
<tr>
<td>No</td>
<td>2,121</td>
<td>46.2</td>
</tr>
<tr>
<td>Mental Health</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2,500</td>
<td>54.5</td>
</tr>
<tr>
<td>No</td>
<td>2,089</td>
<td>45.5</td>
</tr>
<tr>
<td>Domestic Violence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2,151</td>
<td>46.9</td>
</tr>
<tr>
<td>No</td>
<td>2,438</td>
<td>53.1</td>
</tr>
<tr>
<td>Poverty</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1,343</td>
<td>29.3</td>
</tr>
<tr>
<td>No</td>
<td>3,246</td>
<td>70.7</td>
</tr>
</tbody>
</table>

Table 8 displays the permanency outcomes for the PA5 sample. Overall, 44.3% of the cases had all children remain home. Of the 2,556 cases in which at least one child did not remain home, 53.6% of the cases had at least one child reunify, 21.5% had at least one child with a permanent relative/guardianship placement, 25.4% had at least one child adopted, 25.6% had at least one child with a termination of parental rights, and 7.4% had at least one child who emancipated or was in long-term foster care.
Table 8
Permanency Outcomes for PA5 Sample

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Remain Home (N = 4,589)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2,033</td>
<td>44.3</td>
</tr>
<tr>
<td>No</td>
<td>2,556</td>
<td>55.7</td>
</tr>
<tr>
<td><strong>Reunification (N = 2,556)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1,370</td>
<td>53.6</td>
</tr>
<tr>
<td>No</td>
<td>1,186</td>
<td>46.4</td>
</tr>
<tr>
<td><strong>Relative/Guardianship (N = 2,556)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>549</td>
<td>21.5</td>
</tr>
<tr>
<td>No</td>
<td>2,007</td>
<td>78.5</td>
</tr>
<tr>
<td><strong>Adoption (N = 2,556)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>650</td>
<td>25.4</td>
</tr>
<tr>
<td>No</td>
<td>1,906</td>
<td>74.6</td>
</tr>
<tr>
<td><strong>TPR (N = 2,556)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>654</td>
<td>25.6</td>
</tr>
<tr>
<td>No</td>
<td>1,902</td>
<td>74.4</td>
</tr>
<tr>
<td><strong>Emancipation/LTFC (N = 2,556)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>189</td>
<td>7.4</td>
</tr>
<tr>
<td>No</td>
<td>2,367</td>
<td>92.6</td>
</tr>
</tbody>
</table>

Table 9 displays the follow-up outcomes for the PA5 sample. Overall, 33.8% of the cases had a subsequent referral within one year of case closure, 26.8% had a subsequent assessment, 8.0% had a subsequent case involvement, 7.4% had a subsequent founded assessment, and 4.2% of cases had a subsequent removal.
Table 9
Follow-up Outcomes for PA5 Sample (N = 4,589)

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subsequent Referral</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1,551</td>
<td>33.8</td>
</tr>
<tr>
<td>No</td>
<td>3,038</td>
<td>66.2</td>
</tr>
<tr>
<td>Subsequent Assessment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1,228</td>
<td>26.8</td>
</tr>
<tr>
<td>No</td>
<td>3,361</td>
<td>73.2</td>
</tr>
<tr>
<td>Subsequent Founded</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>340</td>
<td>7.4</td>
</tr>
<tr>
<td>No</td>
<td>4,249</td>
<td>92.6</td>
</tr>
<tr>
<td>Subsequent Case</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>369</td>
<td>8.0</td>
</tr>
<tr>
<td>No</td>
<td>4,220</td>
<td>92.0</td>
</tr>
<tr>
<td>Subsequent Removal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>191</td>
<td>4.2</td>
</tr>
<tr>
<td>No</td>
<td>4,398</td>
<td>95.8</td>
</tr>
</tbody>
</table>

PREDICTIVE MODEL RESULTS

To understand the results estimated with the cumulative logit and logistic regression models, we must first understand the terms *odds* and *odds ratio*. For purposes of example, let us simplify the situation and assume that there are two possible outcomes for child welfare cases: successful and not successful. Further assume that 100 cases are studied with 80 cases being successful and 20 cases not being successful. The odds of success is simply the number of successful cases divided by the number of unsuccessful cases. Here, the odds of success is 80/20 = 4. This can be restated as cases are four times more likely to be successful than unsuccessful.

For this study, we are not interested directly in the odds of success. Rather, we are interested in knowing which predictive factors are correlated with an increase or
decrease in the odds of success for a case. Continuing the example above, of the 100 child welfare cases being studied, 30 have a prior history of neglect and 70 do not. Now we can calculate the odds of success for cases with a history of neglect and cases without a history of neglect. Of the 30 cases with a history of neglect, 20 have a successful outcome and 10 have an unsuccessful outcome. This means that the odds of success for cases with a history of neglect are \( \frac{20}{10} = 2 \). Of the 70 cases without a history of neglect, 60 have a successful outcome and 10 have an unsuccessful outcome. This means that the odds of success for cases without a history of neglect are \( \frac{60}{10} = 6 \).

Using the odds values of 2 and 6, we can calculate an odds ratio for these two groups by dividing the odds of success in one group by the odds of success in the other. The odds ratio comparing cases without a history of neglect and with a history of neglect is \( \frac{6}{2} = 3 \). This means that cases without a history of neglect are three times more likely to experience a successful child welfare outcome than are cases with a history of neglect. All of the results in this study will be expressed as odds ratios and percentages which compare two different categories of child welfare cases. To convert an odds ratio to a percentage, subtract 1 from the odds ratio and then multiply by 100%. In the current example with an odds ratio of 3, the calculations are: (a) \( 3-1 = 2 \) and (b) \( 2 \times 100\% = 200\% \). Thus, cases without a history of neglect are 200% more likely to experience a successful child welfare outcome than are cases with a history of neglect.

Cases in this study have five possible outcomes for child welfare success. These are ordered outcomes, meaning that a level 5 is better than 4, a level 4 is better than a level 3, and so on. The odds ratios are valid for any combination of the five groups into
two, *as long as the order is preserved*. Therefore, we can consider score level 5 as one group (i.e. “success”) and score levels 1, 2, 3 and 4 as the other group (i.e. “not success”). Or, we can compare score levels 2, 3, 4 and 5 (i.e. “success”) versus score level 1 (i.e. “not success”). The odds ratio for a specified predictor variable (e.g. poverty presenting issue) will be the same regardless of how we split the ordered outcomes.

Continuing the example above, we can say that the odds of success for cases without a history of neglect are three times greater than for cases with a history of neglect, regardless of whether success is defined as score level 5 or score level 4 and 5 or score level 3, 4 and 5, and so on. Appendix A provides further information regarding how the model’s goodness-of-fit was validated.

**Predictive Model of Composite Outcome Measure**

For the overall model of child welfare success for PA5 cases, the “best six” predictor variables for the composite score level outcome were:

1. number of caregivers
2. neglect risk level from the Colorado Risk assessment
3. poverty presenting issue
4. abuse risk level from the Colorado Risk Assessment
5. age of primary caregiver
6. substance abuse presenting issue

Although not presented in this report, the “best seven” predictors was identical to the best six with the addition of prior removal. The “best eight” predictors had lack of supervision presenting issue and prior case involvement in addition to the same predictors from the best six.

The odds ratios and confidence intervals calculated for the best six predictors are shown in Table 10. These results tell us that on average, a case with two caregivers is
about twice as likely (or 100% more likely) to have a successful outcome than a case with one caregiver. A case where the risk of neglect is low or moderate is almost 1.7 times as likely (70% more likely) to have a successful outcome than a case where the risk of neglect is high. Similarly, a case with no poverty presenting issue is about 1.6 times as likely (60% more likely) to have a successful outcome than a case with poverty presenting issue. A case where the risk of abuse is low or moderate is 1.5 times as likely (50% more likely) to have a successful outcome than a case where the risk of abuse is high. A case where the primary caregiver is age 26 or older is about 1.4 times as likely (40% more likely) to have a successful outcome than a case where the primary caregiver is age 25 or younger. Finally, a case with no substance abuse presenting issue is about 1.2 times as likely (20% more likely) to have a successful outcome than a case where there is a substance abuse presenting issue.

Table 10

Odds Ratios and Confidence Intervals for Best Six Predictors of Child Welfare Success

<table>
<thead>
<tr>
<th>Variables</th>
<th>Comparison Categories</th>
<th>Average Odds Ratio</th>
<th>95% Confidence Intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of caregivers</td>
<td>Two vs. One caregiver</td>
<td>2.14*</td>
<td>(1.92, 2.39)</td>
</tr>
<tr>
<td>Risk of neglect level</td>
<td>Low/Mod. vs. High</td>
<td>1.66*</td>
<td>(1.46, 1.89)</td>
</tr>
<tr>
<td>Poverty presenting issue</td>
<td>No vs. Yes</td>
<td>1.62*</td>
<td>(1.43, 1.84)</td>
</tr>
<tr>
<td>Risk of abuse level</td>
<td>Low/Mod. vs. High</td>
<td>1.50*</td>
<td>(1.32, 1.71)</td>
</tr>
<tr>
<td>Age of primary caregiver</td>
<td>26 or older vs. 25 or younger</td>
<td>1.36*</td>
<td>(1.21, 1.52)</td>
</tr>
<tr>
<td>Substance abuse presenting issue</td>
<td>No vs. Yes</td>
<td>1.24*</td>
<td>(1.11, 1.38)</td>
</tr>
</tbody>
</table>

* Statistically significant (p ≤ .05)
The previous results are discussed in terms of averages. We can expand our understanding of the average estimates by looking at the range of reasonable values for the odds ratios shown in Table 10. Consider the number of caregivers variable. The average odds ratio comparing two caregivers with one caregiver is 2.14, but the range of reasonable values is between 1.92 and 2.39. This means we expect that a case with two caregivers is between 1.9 times as likely (90% more likely) and 2.4 times as likely (140% more likely) to have a successful outcome than a case with one caregiver.

Stated differently, we are 95% confident that the population average odds ratio for the number of caregivers variable falls between these two values. The average odds ratio estimates and confidence intervals for each of the six predictor variables are displayed in Figure 2.

Figure 2

Odds Ratios and Confidence Intervals for Best Six Predictors of Child Welfare Success
A slightly different version of the best six predictive model also was generated. This model used the same six predictor variables, but instead of using the low/moderate and high levels for the abuse and neglect domains of the Colorado Safety and Risk Assessments, the actual numeric scores from the abuse and neglect domains were used. Similar to the risk levels, the actual risk domain scores had a very strong relationship with the composite success outcome. For the abuse domain, a one point increase translated to a 6% decrease in the odds of a successful outcome. For the neglect domain, a one point increase translated to a 7% decrease in the odds of a successful outcome.

Table 11 displays the odds ratios for all of the predictor variables considered in the study (not just the best six). Note that the odds ratio values for the best six are similar to but not identical with the values in Table 10. This is a function of slightly different statistical assumptions when all the variables are included. Other predictors with high average odds ratios include lack of supervision presenting issue, prior removal from home, and prior case involvement, all of which were identified in the best seven and best eight models. There are several odds ratios which are less than 1.00. For example, the odds ratio for the sexual abuse presenting issue predictor variable equals 0.80. This means that a case with no sexual abuse presenting issue is, on average, about 0.8 times as likely (20% less likely) to have a successful outcome as a case where there is a sexual abuse presenting issue.

In addition, some of the reasonable value ranges in column four of the table contain the value 1.00. When an odds ratio can have a reasonable value of 1.00, there is no real difference in the odds of success between the two groups being compared.
When the range of reasonable values contains the value 1.00, we say that the predictor variable is not “statistically significant”. Examples of predictor variables in Table 11 which are not statistically significant include ethnicity of the youngest child and physical abuse presenting issue. This means that there is no difference in odds of success for a case where the youngest child is Caucasian versus a case where the youngest child is non-Caucasian, or for a case where there is no physical abuse presenting issue versus a case where there is a physical abuse presenting issue.

Table 11

*Odds Ratios and Confidence Intervals for All Predictors of Child Welfare Success*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Comparison Categories</th>
<th>Average Odds Ratio</th>
<th>95% Confidence Intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of caregivers</td>
<td>Two vs. One caregiver</td>
<td>2.06*</td>
<td>(1.84, 2.30)</td>
</tr>
<tr>
<td>Poverty issue</td>
<td>No vs. Yes</td>
<td>1.59*</td>
<td>(1.40, 1.80)</td>
</tr>
<tr>
<td>Risk of neglect level</td>
<td>Low/Mod. vs. High</td>
<td>1.50*</td>
<td>(1.31, 1.73)</td>
</tr>
<tr>
<td>Age of primary caregiver</td>
<td>26 or older vs. 25 or younger</td>
<td>1.36*</td>
<td>(1.21, 1.54)</td>
</tr>
<tr>
<td>Risk of abuse level</td>
<td>Low/Mod. vs. High</td>
<td>1.32*</td>
<td>(1.13, 1.53)</td>
</tr>
<tr>
<td>Lack of supervision issue</td>
<td>No vs. Yes</td>
<td>1.24*</td>
<td>(1.10, 1.40)</td>
</tr>
<tr>
<td>Substance abuse issue</td>
<td>No vs. Yes</td>
<td>1.24*</td>
<td>(1.10, 1.39)</td>
</tr>
<tr>
<td>Prior removal from home</td>
<td>No vs. Yes</td>
<td>1.21</td>
<td>(0.99, 1.48)</td>
</tr>
<tr>
<td>Prior case</td>
<td>No vs. Yes</td>
<td>1.18*</td>
<td>(1.02, 1.37)</td>
</tr>
<tr>
<td>Caregiver history of abuse</td>
<td>No vs. Yes</td>
<td>1.12</td>
<td>(0.98, 1.28)</td>
</tr>
<tr>
<td>Prior referral</td>
<td>No vs. Yes</td>
<td>1.12</td>
<td>(0.91, 1.38)</td>
</tr>
<tr>
<td>Mental health issue</td>
<td>No vs. Yes</td>
<td>1.06</td>
<td>(0.95, 1.19)</td>
</tr>
<tr>
<td>Number of children</td>
<td>Two or fewer vs. Three or more</td>
<td>1.02</td>
<td>(0.90, 1.15)</td>
</tr>
<tr>
<td>Physical abuse issue</td>
<td>No vs. Yes</td>
<td>1.01</td>
<td>(0.89, 1.14)</td>
</tr>
<tr>
<td>Founded allegation</td>
<td>No vs. Yes</td>
<td>0.99</td>
<td>(0.89, 1.11)</td>
</tr>
<tr>
<td>Domestic violence issue</td>
<td>No vs. Yes</td>
<td>0.99</td>
<td>(0.89, 1.11)</td>
</tr>
<tr>
<td>Ethnicity of youngest child</td>
<td>Caucasian vs. Non-Caucasian</td>
<td>0.99</td>
<td>(0.89, 1.10)</td>
</tr>
<tr>
<td>Prior assessment</td>
<td>No vs. Yes</td>
<td>0.95</td>
<td>(0.77, 1.17)</td>
</tr>
<tr>
<td>Prior founded assessment</td>
<td>No vs. Yes</td>
<td>0.93</td>
<td>(0.80, 1.08)</td>
</tr>
<tr>
<td>Sexual abuse issue</td>
<td>No vs. Yes</td>
<td>0.80*</td>
<td>(0.67, 0.97)</td>
</tr>
</tbody>
</table>

*Statistically significant (p ≤ .05)*
Case Profiles

Based on the best six predictor variables, a frequency count was generated to identify which “case profiles” were the most common for the ten ARCH counties. By knowing the case and risk characteristics, presenting issues, and predicted outcomes of these common case profiles, caseworkers and supervisors may better align their practice with the needs of these families. Table 12 displays the eight most frequent case profiles based on the six strongest predictors of child welfare success. These eight profiles comprise an N of 2,240, which represents 48.8% of all the cases in this study.

Table 12

Most Frequent Case Profiles Based on Best Six Predictors

<table>
<thead>
<tr>
<th>Profile</th>
<th>Caregiver Number</th>
<th>Caregiver Age</th>
<th>Substance Abuse</th>
<th>Poverty</th>
<th>Neglect Level</th>
<th>Abuse Level</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Two</td>
<td>Older</td>
<td>No</td>
<td>No</td>
<td>Lower</td>
<td>Lower</td>
<td>577</td>
<td>12.6</td>
</tr>
<tr>
<td>2</td>
<td>Two</td>
<td>Older</td>
<td>Yes</td>
<td>No</td>
<td>Lower</td>
<td>Lower</td>
<td>475</td>
<td>10.4</td>
</tr>
<tr>
<td>3</td>
<td>One</td>
<td>Older</td>
<td>No</td>
<td>No</td>
<td>Lower</td>
<td>Lower</td>
<td>327</td>
<td>7.1</td>
</tr>
<tr>
<td>4</td>
<td>One</td>
<td>Older</td>
<td>Yes</td>
<td>No</td>
<td>Lower</td>
<td>Lower</td>
<td>207</td>
<td>4.5</td>
</tr>
<tr>
<td>5</td>
<td>Two</td>
<td>Younger</td>
<td>Yes</td>
<td>No</td>
<td>Lower</td>
<td>Lower</td>
<td>206</td>
<td>4.5</td>
</tr>
<tr>
<td>6</td>
<td>Two</td>
<td>Younger</td>
<td>No</td>
<td>No</td>
<td>Lower</td>
<td>Lower</td>
<td>198</td>
<td>4.3</td>
</tr>
<tr>
<td>7</td>
<td>One</td>
<td>Younger</td>
<td>No</td>
<td>No</td>
<td>Lower</td>
<td>Lower</td>
<td>132</td>
<td>2.9</td>
</tr>
<tr>
<td>8</td>
<td>Two</td>
<td>Older</td>
<td>Yes</td>
<td>No</td>
<td>Higher</td>
<td>Higher</td>
<td>118</td>
<td>2.6</td>
</tr>
</tbody>
</table>

Note. The % column represents the percentage of the total sample of 4,589

At 12.6%, or one out of every eight cases, Profile 1 is the most common profile and the best possible profile in terms of risk. Specifically, this profile represents a family with two caregivers, a primary caregiver 26 years of age or older, no substance abuse or poverty presenting issues, and low or moderate risk for future abuse or neglect.
While the other seven profiles among the most frequent eight had at least one “negative” predictor, Profile 8 had the most with three, including substance abuse presenting issue, and a high score level on both the neglect and abuse domains of the Colorado Risk Assessment.

As displayed in Figure 3, the case profiles are associated with different probabilities for child welfare success as measured by the composite outcome score levels. For example, Profile 1 (the profile with all “positive” predictors) is associated with the highest probability of a level 5 outcome at approximately 45%, while Profile 8 (the profile with three “positive” and three “negative” predictors) is associated with the lowest probability of a level 5 outcome at approximately 20%.

Figure 3

*Predicted Probabilities of Composite Outcome Score Level for Eight Most Frequent Case Profiles*

Interestingly, the least common profile is the mirror image of Profile 1, in that it is characterized by the least desirable outcomes for all of the predictors. However, this profile (not shown in Figure 3) was only present in 32 cases or 0.7% of the sample. By
further comparison, this profile with all “negative” predictors is associated with only a 5% probability of a level 5 outcome and a 55% probability of a level 1 outcome.

Predictive Models of Specific Outcome Measures

Four additional logistic regression models (Agresti, 2007) were run to examine which variables were the most predictive in achieving the following specific case outcomes:

1. no subsequent case involvement
2. no subsequent founded assessment
3. no subsequent removal
4. no termination of parental rights

For each of these outcomes, the best six predictor variables were chosen and odds ratios were calculated. Although the generalized \( R^2 \) statistic (Nagelkerke, 1991) is used in cumulative logit and logistic regression models, it does not have the same meaning as \( R^2 \) for a traditional regression model (i.e. describes the percentage of variance explained). However, it is useful for comparing models to one another.

The first three models do not display as strong a correlation between predictors and the outcome variable as does the model which uses the composite outcome score level. The generalized, rescaled \( R^2 \) statistic for the overall model with the outcome score level and the best six predictors is 12.8% (out of a possible 100%). The generalized, rescaled \( R^2 \) statistics for the no subsequent case, no subsequent founded assessment, and no subsequent removal models are 4.5%, 3.1%, and 4.1%, respectively. It is clear, that these three models have a lesser correlation between predictors and outcomes than does the score level model. In other words, there are many other unmeasured factors related to these outcomes but are not in the model.
The generalized, rescaled $R^2$ statistic for the no termination of parental rights model is 16.3%, showing that this outcome is modeled better than the previous three specific outcome measures. As displayed in Table 13, the best six predictors are similar to the overall composite outcome score level model, but also include prior assessment as a predictor variable. With an odds ratio of 0.55, cases without a prior assessment have a 45% lower chance of not having a TPR than do cases with a prior assessment. Although this result appears counterintuitive, it may be that these families have not yet received services or an intervention, and come in to the system at a much higher risk, sometimes with younger children and a wide range of concerns. As such, a TPR may be more likely to occur the first time a family enters the system and less so after multiple involvements or interventions. Another interesting finding is that the risk of abuse level variable was not a significant predictor in this model.

Table 13

*Odds Ratios and Confidence Intervals for Best Six Predictors of No Termination of Parental Rights*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Comparison Categories</th>
<th>Average Odds Ratio</th>
<th>95% Confidence Intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poverty issue</td>
<td>No vs. Yes</td>
<td>2.27*</td>
<td>(1.88, 2.75)</td>
</tr>
<tr>
<td>Age of primary caregiver</td>
<td>26 or older vs. 25 or younger</td>
<td>2.16*</td>
<td>(1.80, 2.59)</td>
</tr>
<tr>
<td>Risk of neglect level</td>
<td>Low/Mod. vs. High</td>
<td>2.04*</td>
<td>(1.67, 2.50)</td>
</tr>
<tr>
<td>Number of caregivers</td>
<td>Two vs. One caregiver</td>
<td>1.96*</td>
<td>(1.64, 2.34)</td>
</tr>
<tr>
<td>Substance abuse issue</td>
<td>No vs. Yes</td>
<td>1.63*</td>
<td>(1.35, 1.97)</td>
</tr>
<tr>
<td>Prior assessment</td>
<td>No vs. Yes</td>
<td>0.55*</td>
<td>(0.46, 0.66)</td>
</tr>
</tbody>
</table>

*Statistically significant (p ≤ .05)*
DISCUSSION

The following discussion summarizes the findings from the development and testing of a predictive model of child welfare success. The conclusions and implications should be interpreted in light of the methodological limitations of the study.

Conclusions

The study was successful in answering two of the three research questions posed. For the first research question, the most successful child welfare case was defined as one where children remain with or return home to their parents and have no subsequent involvement with the child welfare system. However, success is on a continuum and there are numerous pathways to achieving a successful outcome from the child’s perspective. According to the findings, 80% of the cases had an outcome level of 2, 3, 4, or 5, which translates into an outcome score greater than 0. This indicates that that four out of every five cases ended with children remaining home, returning home, or living with relatives or in guardianship and having little to no subsequent involvement. Thus, cases in the current study were four times more likely to be successful than unsuccessful.

It should be emphasized that the composite outcome was designed to measure child welfare success from a child’s perspective rather than the system’s perspective. Take the case where two children are adopted following a termination of parental rights (this would equate to an outcome score of 0 as each child receives a -2 for the TPR and a +2 for the adoption). Although this could be considered successful by the system because all children achieved permanency, the outcome would be considered not successful in this study because TPR is probably the least preferable experience from a
child’s perspective. This is not to say that adoption itself is an unsuccessful outcome. It is likely the most desirable permanency outcome once a TPR has occurred and likely provides the child with the best chance of long-term success.

For the second research question, the predictors of child welfare success were cases with: (1) two caregivers in the home, (2) low or moderate risk of future neglect, (3) no family poverty presenting issue, (4) low or moderate risk of future abuse, (5) older primary caregivers, and (6) no caregiver substance abuse presenting issue. Other significant predictors include no prior removal from home, no lack of supervision presenting issue, and no prior case involvement. Again, child welfare success is on a continuum, so many cases are predicted to be successful even if some of these protective factors are not in place. However, the most frequent case profiles suggest that a majority of families have many of these protective factors and that child welfare success is very attainable with effective caseworker practice and family engagement.

Unfortunately, the third research question could not be answered because the study design and available data did not support the identification of specific services or a combination of services that were related to child welfare success. Again, with observational data and a context where services and placements have already occurred, there is an inability to study the causal effects of explanatory variables. Furthermore, the structure and recording of Core Services are not consistent across counties. For example, multisystemic therapy is recorded differently as it is included under mental health services in some counties and as a county-designed service in others. The methodological challenges that precluded the exploratory analysis and limited the precision of the predictive model are presented in the following section.


**Limitations**

Perhaps the most notable limitation of this study is the lack of predictor and explanatory variables available in Colorado Trails. There are no measures of employment and education and no true measures of poverty and mental health problems. There is limited data available on the presenting needs of children and families (e.g., clinical measures of substance abuse or mental health) at the time of involvement with the child welfare system. There also is a lack of explanatory variables, as there are few available measures of family supports, family engagement, and family meetings. It would be easy to recommend that new and more precise predictor and explanatory variables be measured, but there are workload issues around collecting these data. One option is to reformat the social history narrative and use that information to inform some of these potential variables. Specifically, a “pick list” could be added to the end of each question to allow for the collection of summary data (e.g., no family supports, some family supports, sufficient family supports).

The nature of Core Services data documentation and tracking is another important limitation to consider. The constraints of these data include variability in how services are recorded in different counties, difficulty in tracking case costs for some contracted services, diversity in the types of county-designed services offered, lack of data on why services are provided (i.e., presenting needs and specific goals), and inability to quantify service participation. It should be noted that new enhancements and functionalities in Colorado Trails will allow for the future collection and integration of data on service outcomes and participation. Counties might also benefit from being able to include services not paid for through Core Services in Colorado Trails. Currently,
many counties maintain multiple databases to record data on services provided to families through grants, or using private insurance. If Colorado Trails was able to record and report data on these services, it could assist in the quality and completeness of Core Services data available for study.

The use of child welfare administrative databases can pose challenges regarding the consistency and accuracy of the data entered into the system. For example, a predictive model could not be run for the emancipation outcome because many of these cases had been removed from the study because of missing data. These were long-term cases opened under different data entry requirements. As a result, the study was not able to model the case and risk characteristics, presenting issues, and outcomes for this population. Another example is the NCFAS, which had a high percentage of missing data because it was not mandated for all cases during the study timeframe.

A final limitation is that an associational research design can only yield information regarding correlation (the relationship between two variables) and not causation (providing service A will lead to outcome B). This is an important point to emphasize when disseminating this study so that practitioners and policymakers are able to apply the findings within the proper context.

**Implications**

The study reveals that, of the predictive variables analyzed, the most significant predictor of child welfare success is when children have two caregivers in the home. An implication of this finding is that if caseworkers can provide support services that “mimic” the presence of two caregivers, a family with one caregiver could improve its likelihood of child welfare success. Specific support services may include coaching,
mentoring, and life skills classes. Another implication is that caseworkers could engage more people in developing the case plan to identify family resources and supports that could also mimic the presence of a second caregiver. A related suggestion is to make sure that supports are in place before closing a case. The other major implication is the importance of conducting a diligent search for fathers and offering specific programs for fathers to keep them in the home or to remain involved in a child’s upbringing. The implications for the caregiver age finding is that younger primary caregivers may struggle with some of the same issues as single caregivers and may benefit from some of the same services and programs.

Not surprisingly, poverty was a strong predictor of child welfare success. Many practitioners believe that poverty is a root cause of child maltreatment and have petitioned for alternative ways to provide families (who are in imminent risk of out-of-home placement) with financial assistance. Currently in Colorado, county child welfare agencies can offer families a one-time yearly payment up to $400 under the Special Economic Assistance Program – an amount that is frequently not sufficient to meet a family’s immediate emergency financial needs. Furthermore, there is a great need for stable housing, educational support, and employment training.

The inclusion of risk abuse level and risk neglect level in the list of the six most powerful predictors adds a measure of confidence that the assessment tools are meaningful and informative resources for case planning. This finding also has implications for outcomes, in that spending resources to promote change in specific dynamic items on the risk assessment could improve the odds of child welfare success. For example, targeting resources to address a caregiver’s substance abuse problem
could lead to a reduction on the neglect scale and a reduction on the abuse scale. Although most of the items on the assessment tools are static (historical) measures, highlighting what can be addressed by resources and services seems worthwhile.

Another indication of the importance of the risk of neglect and abuse levels in the final model is the relationship between the case profile characteristics and the composite outcome measure. For example, Profiles 1, 2, 5, and 6 are comprised of families with two caregivers, no poverty presenting issues, and lower risk neglect and abuse levels, thus having the highest probability of a level 4 or 5 outcome. Although Profile 8 also includes families with two caregivers, this protective factor does not appear to balance out the higher risk abuse and neglect levels. As a result, Profile 8 has the lowest probability of a level 4 or 5 outcome and the highest probability of a level 1 outcome.

Based on the finding that the profiles with the greatest probability for success (i.e., low or moderate risk cases) were the most common types, there is a great opportunity for agencies to take more of a strengths-based approach with families. With the presence of protective factors, families can be engaged with the idea of long-term success rather than short-term problem solving. It should be noted that there still is a need to serve these lower risk families, as more than half are predicted to have a less successful case outcome. Since study data show a strong predictive correlation between the high risk level and less successful child welfare outcomes, a sound practice approach might be to conduct a team-based staffing prior to closure for higher risk families that are not being opened to a case for ongoing services.
From a policy perspective, the Colorado Safety and Risk Assessments should be enhanced by adding strength-based variables and descriptive indicators that can be used in future evaluations, as they are otherwise not readily available in the existing Colorado Trails data system. We are recommending that the following specific descriptive measures be added to the safety or risk assessment:

a. Family structure  
b. Status of Biological/Legal Father  
c. Family income/Poverty  
d. Primary caretakers  
e. Primary caretaker(s) employment status  
f. Public assistance  
g. Primary caretaker highest level of education  
h. Available family supports  
i. Level of engagement/cooperation

Of course, any modifications or updates to the assessment tools should only be made after a study of the reliability and validity of the individual constructs and the revised instruments as a whole.

One surprising finding was that the mental health presenting issue was not a significant predictor of child welfare success. It is possible that the mental health proxy variable was not sufficiently precise, as data on the specific type, intensity, and duration of mental health services was not available. Furthermore, there is a need for better training on diagnosing mental health problems, in that the risk and safety assessments are based on nonprofessional assessment of mental health. Although it is possible that mental health is evidenced in other presenting issues, such as substance abuse and poverty, there was not a large intercorrelation between these variables. Another explanation is that the level of resources currently available to respond to mental health needs may result in a greater likelihood that these needs are mitigated by case end.
Therefore, mental health need at the outset may not show up as a significant predictor of the ultimate success of a case. If this hypothesis were true, a study of service effectiveness would show that mental health services were successful in reducing the level of mental health need in families with this presenting issue. This may also explain why the domestic violence proxy was not a significant predictor. As a corollary, the significant predictor variables may not have similar levels of treatment availability (e.g., substance abuse), the prescribed treatments may be less effective in mitigating the actual need (e.g., parenting classes), or specific treatments may not exist to address these needs (e.g., poverty).

Implications for child welfare practitioners would be to increase the level of funding and availability of appropriate treatment options for those risk factors or presenting issues that emerged as significant predictors of child welfare success. However, this may not be possible because there are limited resources available and increasing funding for one treatment often means reducing support for another treatment option. It should be noted that the findings from this study do not suggest that funding for mental health and domestic violence services should be reduced because they are not significant predictors. Rather the findings indicate that more resources should be made available to programs that may reduce poverty or increase familial supports.

Although the low generalized $R^2$ statistic suggests that the predictive variables used in the current study could be improved upon, the results offers an exciting starting point for which to launch future research in measuring child welfare success. A randomized control design is needed to answer the question of what type of Core...
Services package yields the greatest likelihood of success. A study of service
effectiveness could provide evidence for the reduction or elimination of services that are
not proven to be effective and the enhancement of services that are effective. An
explanatory study would require a research design which allows random assignment of
families to either (a) receiving services or (b) not receiving services. Similarly, one could
randomly assign families with equivalent need to two different types of services.
However, random assignment in this context raises ethical issues which have yet to be
resolved.

To further capitalize on the safety and risk assessment finding, a reliability and
validation study is recommended. A criterion validity study would be useful in examining
the relationship between the composite outcome measure and actual family
preservation outcomes. Other recommendations for future research include
investigating predictors of other child welfare outcomes, such as children who become
re-involved with county child welfare agencies after a finalized adoption. Lastly, there is
a clear need for further model development and for research related to predicting family
preservation outcomes and child welfare success.
REFERENCES


Appendix A

Technical Note on the Validation of the Fit of the Statistical Model

The primary statistical approach used in this study is called a cumulative logit model with proportional odds assumption. As with any model, the assumptions made should be validated to be certain that the model is a good fit for the data. In this case, the assumption that needs to be checked is the proportional odds assumption.

“Proportional odds” means that the odds ratio associated with a predictor variable is the same regardless of how success is defined using the outcome variable. Thus, an odds ratio is essentially the same, regardless of whether “success” is defined as only score level 5 (with levels 1, 2, 3 or 4 as “not success”) or whether success is defined as either score level 2, 3, 4 or 5 (with level 1 as “not success”) and so on for all other possible definitions of success. Again, if the odds ratio is the same for any definition of success, then the proportional odds assumption holds.

In order to validate this assumption, four separate models (using the best six predictors) were run with different definitions of success: (a) success = score level 5, (b) success = score level 4 or 5, (c) success = score level 3, 4 or 5 and (d) success = score level 2, 3, 4 or 5. Although the predictor variable odds ratios were not identical for each of the four models, they were close enough in a practical sense to ensure that using the cumulative logit model with the proportional odds assumption was a reasonable analytic choice.
Appendix B

Colorado Safety Assessment/Plan

Safety Concerns

Respect Concern
N 1. Caregiver(s) in the home is out-of-control and/or violent
N 2. Caregiver(s) describes or acts toward child in predominately negative terms and/or has unrealistic expectations likely to cause moderate to severe harm.
N 3. Caregiver(s) has caused harm to the child or has made a credible threat of harm.
N 4. Caregiver(s) explanations of injuries present are unconvincing.
N 5. The caregiver(s) refuses access to the child or there is reason to believe the family will flee.
N 6. Caregiver(s) is unwilling or unable to meet the child's immediate needs for food, clothing, and shelter.
N 7. Caregiver(s) is unwilling or unable to meet the child's significant medical or mental health care needs
N 8. Caregiver(s) has not or is unable to provide sufficient supervision to protect child from potentially moderate to severe harm.
N 9. Child is fearful of caregiver(s), other family members or other people living in, or having access to, the home.
N 10. Child's physical living conditions endanger the child's immediate health and safety.
N 11. Caregiver(s) alleged or observed substance use may seriously affect ability to supervise, protect or care for the child.
N 12. Child sexual abuse is suspected and circumstances suggest that the child physical and/or emotional safety is of immediate concern.
N 13. Caregiver(s) alleged or observed emotional instability or developmental delay seriously affects his/her ability to supervise, protect, or care for the child.
N 14. Domestic violence exists in the home and places the child in danger of physical and/or emotional harm.
N 15. Caregiver(s) has previously abused or neglected a child or is suspected of such, and the severity of the past maltreatment or caregiver(s) response to previous intervention suggests the child may be unsafe.
N 16. Primary caregiver has not or is unable to protect child.
N 17. Child is unable to self-protect, assertively prevent harm, or access protective relationship(s) to assure safety; and at least one of the above safety concerns exists.

Safety Conclusion

No safety concerns are identified. There are no children likely to be in danger of severe harm. No further safety action is necessary.
### Colorado Family Risk Assessment

**Family Name:**

**Assessment ID:**

**Worker:**

**Date:**

#### Neglect

- **N1. Current Allegation is for Neglect**
  - a. No (1)
  - b. Yes (1)

- **N2. Prior Neglect Investigations (assign highest score that applies)**
  - a. None (1)
  - b. Investigation only (1)
  - c. One substantiated investigation (2)
  - d. Two or more substantiated investigations (3)

- **N3. Household has Previously Received Child Protective Services**
  - a. No (0)
  - b. Yes, previously received services (1)
  - c. Yes, prior CPS child removal from household (3)

- **N4. Number of Children in Household**
  - a. Two or Fewer (1)
  - b. Three or More (1)

- **N5. Age of Youngest Child in Household**
  - a. Three or Older (0)
  - b. Two or Younger (1)

- **N6. Primary Caregiver’s Assessment of Incident**
  - (Check applicable items and add for score)
    - a. Minimizes harm to children (2)
    - b. Displaces responsibility or severity (2)
    - c. Not applicable (0)

- **N7. Primary Caregiver Provides Physical Care or Supervision Inconsistent with Child’s Need**
  - a. No (0)
  - b. Yes (2)

- **N8. Primary Caregiver has a Substance Use Problem**
  - a. No (0)
  - b. Yes (1)

- **N9. Child in Household has Mental Health/Behavioral Problem**
  - a. No (0)
  - b. Yes (1)

- **N10. Recent History of Domestic Violence in the Household**
  - a. No (0)
  - b. Yes (1)

- **N11. Caregiver(s) Have History of Homelessness**
  - a. No (0)
  - b. Yes (3)

**Total Neglect Risk Score:**

#### Abuse

- **A1. Prior Investigations**
  - a. None (1)
  - b. 1 to 3 (1)
  - c. 4 or more (3)

- **A2. Household has Previously Received Child Protective Services**
  - a. No (0)
  - b. Yes (2)

- **A3. Primary Caregiver has History of Abuse or Neglect as a Child**
  - a. No (0)
  - b. Yes (2)

- **A4. Primary Caregiver was Placed in Protective Services as a Child**
  - a. No (0)
  - b. Yes (3)

- **A5. Caregiver(s) Provide Supervision Inconsistent with Child’s Needs**
  - a. No (0)
  - b. Yes (1)

- **A6. Caregiver’s Employment Excessive/Inappropriate Discipline**
  - a. No (0)
  - b. Yes (2)

- **A7. Caregiver(s) Involved in Disruptive/Volatile Adult Relationships**
  - a. No (0)
  - b. Yes (1)

- **A8. Characteristics of Children in the Household**
  - (check applicable items and add for score)
    - a. Mental health/behavioral problems (2)
    - b. Physical disability (2)
    - c. Not applicable (0)

- **A9. Caregiver(s) has History of Mental Health Treatment**
  - a. No, neither caregiver (0)
  - b. Either caregiver (1)
  - c. Both caregivers (2)

- **A10. Secondary Caregiver has a Substance Use Problem**
  - a. N/A - no secondary caregiver (0)
  - b. No problem with drugs or alcohol (1)
  - c. Alcohol only (1)
  - d. Other drugs and alcohol combined (2)

**Total Abuse Risk Score:**

#### Scoring Risk Level

<table>
<thead>
<tr>
<th>Neglect Score</th>
<th>Abuse Score</th>
<th>Scored Risk Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 – 1</td>
<td>2 – 0</td>
<td>Low</td>
</tr>
<tr>
<td>0 – 7</td>
<td>1 – 6</td>
<td>Moderate</td>
</tr>
<tr>
<td>8 – 13</td>
<td>7 – 12</td>
<td>High</td>
</tr>
</tbody>
</table>

**Policy Override**

Check Box if condition shown below is applicable in this case. If any condition is applicable, override final risk level to high.

1. Sexual abuse cases AND the perpetrator is likely to have access to the child victim.
2. Non-accidental injury to an infant
3. Serious non-accidental physical injury requiring hospital or medical treatment.
4. Parent/Caregiver action or inaction resulted in death of a child due to abuse or neglect (previous or current).

**Discretionary Override**

Check Box to select discretionary override and indicate reason. Final risk level may be overridden one level higher.

1. Override Low to Moderate
2. Override Moderate to High

**Reason for discretionary override:**

**Supervisor’s Review/Approval of Discretionary Override:**

**Final Risk Level:**

- Low
- Moderate
- High

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Appendix C

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