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# Maternal Intimate Partner Violence Victimization Before and During Pregnancy and Postbirth Child Welfare Contact: A Population-Based Assessment

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**Abstract**

We conducted a population-based prospective cohort study to help elucidate the predictive relationship between a maternal prebirth selfreported history of intimate partner violence (IPV) and any postbirth reported allegation to Child Protective Services (CPS) by age 2. We linked data from the 2009–2010 Alaska Pregnancy Risk Assessment Monitoring System with CPS data through 2012. Among this cohort, we found that 8.0%$_w$ self-reported experiencing IPV 12 months prior or during pregnancy, and 8.0%$_w$ of the offspring experienced at least one CPS report of alleged maltreatment during the study period. The predictive relationship varied by maternal educational attainment. Among mothers with 12+ years education completed, the odds of a CPS report were 3.9 times compared to those with no IPV, while among mothers with <12 years education completed, no association was noted. These results suggest that for a subset of Alaskan families, maternal history of IPV is a strong independent predictor of future CPS contact.

**Keywords**

child maltreatment, interpersonal relationships, longitudinal research, missing data, partner violence, attachment

Both intimate partner violence (IPV) and child maltreatment (CM) are often underrecognized factors that contribute to numerous negative public health problems (Brown, Fang, & Florence, 2011; Buckingham & Daniolos, 2013; Coker et al., 2002; Dutton et al., 2006; Kaess et al., 2013; Norman et al., 2012; Tjaden & Thoennes, 2000). According to the most recent National Incidence Study (NIS-4), an estimated 2.9 million children experience some form of maltreatment annually, and (Sedlak et al., 2010) other estimates suggest that 12.5% of children will experience a confirmed case of maltreatment prior to age 18 (Wildeman et al., 2014). Likewise, the National Violence Against Women Survey estimated that 4.7% of women are physically assaulted by an intimate partner each year, and 29 million have experienced severe physical violence by an intimate partner in their lifetime (Breiding, Chen, & Black, 2014). The problem, however, is likely much larger, as it is widely accepted that reported IPV and CM underestimate actual incidence (AlEissa et al., 2009; Ewigman, Kivlahan, & Land, 1993; Gelles, 2000; Parrish & Gessner, 2010; Waltermaurer, 2005; Zolotor, Motsinger, Runyan, & Sanford, 2005).

When examining these family violence outcomes, pregnant women and their young children are an important subpopulation due to both their increased vulnerability for victimization and the potential opportunity for prevention. Although research has identified substantial overlap between IPV and CM broadly, much of the literature on violence exposure ignores this critical development period or suffers from methodological limitations. Specifically, few studies examine the time ordering of maternal IPV during pregnancy and risk for subsequent CM of the child. Further, most studies use clinical samples to study the co-occurrence of IPV and CM, precluding generalizability to public health efforts focused on broader populations. The purpose of this study is to address these methodological limitations using a longitudinal design with a population-based sample to understand whether maternal self-reported IPV prior to

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or during pregnancy increases the risk for later postbirth child welfare system involvement by age 2.

## Background

Pregnant women and young children are particularly vulnerable populations for risk of victimization. Differences in definitions, measurement, and sampling strategy have yielded a broad range of prevalence estimates. One review of the research reported 3–19% of women experience IPV victimization during pregnancy (Sharps, Laughon, & Giangrande, 2007). A previous study analyzed IPV victimization using the Pregnancy Risk Assessment Monitoring System (PRAMS) for 26 U.S. states and found that 5.8% of women reported physical abuse by a male partner during or in the year prior to pregnancy (Silverman, Decker, Reed, & Raj, 2006). A review of population-based studies (Kendall-Tackett, 2007) reported rates of IPV during pregnancy is 3.6% for a sample in China (Guo, Wu, Qu, & Yan, 2004), 6.1% in North Carolina (Martin, Mackie, Kupper, Buescher, & Moracco, 2001), and 5.1% in the United Kingdom (Bowen, Heron, Waylen, Wolke, & ALSPAC Study Team, 2005). Young children are consistently identified as having the highest rate of CM. In the United States, over a quarter (27.3%) of all child victims (cases in which maltreatment was substantiated or indicated) were younger than 3 years. Newborns (<1 year) had the highest rate at 23.1 per 1,000 children, followed by 11.8 per 1,000, and 11.4 per 1,000 for 1- and 2-year-olds, respectively (U.S. Department of Health and Human Services, 2015).

There is considerable evidence that IPV and CM are often found in the same home. Depending on the sample, the overlap between IPV and CM varies (Herrenkohl, Sousa, Tajima, Herrenkohl, & Moylan, 2008; Zolotor, Theodore, Coyne-Beasley, & Runyan, 2007). Based on a review of four population-based samples, Edleson et al. reported that the co-occurrence of IPV and CM ranged from 5.6% to 11% (Edleson, Mbilinyi, Beeman, & Hagemeister, 2003) The Illinois Families Study (IFS), a small retrospective cohort study, surveyed approximately 1,000 mothers receiving public assistance about their recollected childhood and adult exposure to violence and used Child Protective Services (CPS) records to obtain information on investigated reports of perpetrated CM (Renner & Slack, 2006). This study found that concurrent CM and IPV occurred in an estimated 30–60% of families, however the timing of these events was not isolated and only represented a subset of the general population

The Adverse Childhood Experiences Study (ACES) surveyed over 17,000 adults in their 50s about exposure to violence during childhood. This study found that adults who reported witnessing domestic violence in the home (13% of the sample) were between 2 and 6 times as likely to also report other types of child abuse and neglect (Dube, Anda, Felitti, Edwards, & Williamson, 2002). The Fragile Families and Child Well-Being Study is a longitudinal birth cohort study that oversampled nonmarital births. Findings from follow-up surveys at age 3 again support a heightened risk of self-reported CM perpetration among victims of IPV, even after controlling for maternal depression and stress (Taylor, Guterman, Lee, & Rathouz, 2009).). Finally, in a nationally representative telephone survey, the National Survey of Children's Exposure to Violence found that the likelihood of lifetime maltreatment among those witnessing partner violence was 4 times as high as those without after controlling for a host of other factors (Hamby, Finkelhor, Turner, & Ormrod, 2010).

Despite compelling evidence for a link between IPV and CM, there are many limitations to the current research. Research supporting the link between IPV and the various forms of CM has primarily occurred among, and been limited to, high-risk populations (McGuigan & Pratt, 2001; Renner & Slack, 2006) and used cross-sectional or retrospective designs, thus yielding a recent call for more prospective, longitudinal studies on this topic (Herrenkohl et al., 2008). Other studies have examined the association between IPV and both maternal and neonatal health outcomes but have not addressed maltreatment outcomes (Silverman et al., 2006). Retrospective studies, such as the ACES and IFS, require adults to attempt to remember experiences that occurred in the past. Maternal IPV during and prior to pregnancy, and CM prior to age 2 are experiences that many adults would not be able to recall decades later.

Additionally, many studies document the overlap or co-occurrence of IPV and CM, but there are limited population-based longitudinal studies that address the relationship between historic maternal IPV and subsequent CM or contact with child welfare of children. Isolating and clearly documenting the time ordering of these events in the general population are critical when developing predictive models to inform primary prevention population-based strategies. For example, the Fragile Families and Child Well-Being Study is a national longitudinal study that completed the first wave of data collection at or near the time of birth and included a measure of father-to-mother IPV. The Year 3 wave of data collection included self-reported assessment of neglectful and aggressive parenting. One study using this data found that coercive IPV, but not physically violent IPV, at Year 1 was significantly associated with neglect at Year 3 (Nicklas & Mackenzie, 2013). Another study, using data from only Wave 3, found that mothers who experienced IPV were more likely to report the use of psychological and physical aggression toward their children (Taylor et al., 2009). More longitudinal studies that represent the underlying population distribution across different developmental windows can improve our understanding of the linkage between these two forms of violence.

Limited research has attempted to describe the IPV and CM relationship by identifying and quantifying influential variables that moderate and/or mediate the relationship. Only one prospective, (nonpopulation based) longitudinal study could be found that examined moderation and mediation of the relationship between IPV and CM among mothers of young children. A study of first-time mothers participating in home-visiting services found that maternal depression mediated the relationship between IPV and maltreatment risk (Cowart, 2012). This study

also found that parenting and social stress did not moderate the relationship between IPV and maltreatment.

Pregnancy is a critical time period of great vulnerability and opportunity. There is heightened victimization during this period, which may be especially dangerous and potentially lethal (Burch & Gallup, 2004; Sharps et al., 2007). However, pregnant women often interact with a large number of health care and other social service providers, presenting many opportunities for screening and intervention.

One longitudinal study conducted on a sample of women in seven public hospitals in Hong Kong found that mothers who reported IPV during pregnancy were nearly 2 times as likely to report subsequent child physical maltreatment (Chan et al., 2012). This study highlighted that maternal IPV predicts physical child abuse and that sustained IPV mediates this association. These researchers call for clinical screening of violence during prenatal and postnatal periods as a way of preventing CM. Another smaller study compared scores on the Child Abuse Potential Inventory, a screening tool designed to be used by child welfare workers for the detection of physical child abuse at 1 month after delivery among mothers who screen positive for IPV during pregnancy (Casanueva & Martin, 2007). Findings indicated that women who reported IPV victimization were about 3 times as likely to have high child abuse potential. Both studies utilized small samples drawn from clinical populations and relied on self-reported measures of both IPV and CM.

Population-based longitudinal studies, opposed to clinical, high-risk, or convenience studies are needed to elucidate the association between these exposures in the general population, inform public health practice, and measure the utility of population level screening for prevention. Longitudinal cohort studies that utilize representative samples (or entire cohorts) of the underlying population distribution are crucial for quantifying risk and understanding the predictive probabilities of exposure–outcome relationships in a population over time. This longitudinal population-based cohort study was created by linking PRAMS survey responders with Child Protective Services (CPS) administrative data. We used this novel cohort to examine the longitudinal association of self-reported maternal IPV experienced 12 months prior to or during pregnancy and subsequent reports of CM.

Alaska has elevated prevalence of both CM and IPV relative to national averages. In Alaska, approximately 8% of children less than 18 years of age experienced at least one reported allegation to CPS in 2010 (citation omitted). Further, recent estimates indicate that 12% of Alaska women over 18 years of age self-report IPV and/or sexual violence in the past year, with 48% reporting IPV in their lifetime (A. Rosay, 2011; A. M. L. Rosay, 2010). The indigenous population of Alaska accounts for approximately half of all CM and IPV but only makes up about 30% of the total population. Additionally, the extreme rurality of Alaska highlights the need to identify key predictors of maltreatment that can be assessed during specific high-risk or high-contact periods by qualified and capable health care professionals.

We are interested in identifying the unique effects of prenatal victimization on risk for later CM. Given the impact of IPV on women's health and the effect of CM on the developing child, the best course of action is early detection and prevention. By focusing on IPV prior to and during pregnancy and identifying subsequent reports of CM in a large, population-based cohort we can identify predictive risk factors that can be used to inform the primary prevention of IPV and CM.

## Methods

This study (conducted in 2014) utilizes a prospective observational cohort design that links questionnaire results from all Alaska PRAMS respondents in the 2009 and 2010 birth years with Alaska's CPS agency reported allegations through 2012. The source population consists of live births occurring in the State of Alaska during the 2009 and 2010 birth years ($n = 22{,}524$). During the PRAMS study period, 3,732 (16.6%) women were sampled and 2,389 completed the PRAMS survey, resulting in a $67\%_w$ weighted response rate ($69\%_w$ in 2009 and $65\%_w$ in 2010).

The PRAMS survey collects self-reported information on maternal attitudes and experiences before, during, and shortly after delivery of a live-born infant. In Alaska, nearly 1 in 6 live births are sampled through a stratified random sample of birth certificates each month, with stratification conducted according to maternal race Alaska Native/American Indian (AN/AI) and non-Alaska Native (non-AN/AI) and birth weight (<2,500 and ≥2,500 g). Women are sampled between 2 and 6 months after giving birth (on average of 3 months after giving birth). Complete survey methodology is described elsewhere (Shulman, Gilbert, Msphbrenda, & Lansky, 2006).

For this analysis, each PRAMS respondent was linked to any valid CPS reported allegation of maltreatment by way of Alaska birth records of the sampled infant. The rational of this linkage approach has been described elsewhere (Parrish, Young, Perham-Hester, & Gessner, 2011). Probabilistic linkages (fuzzy matches) were initiated on three infant identifiers and include date of birth, infant last name, and infant first name. The Edit and Q-grams distance metrics (Cohen, Ravikumar, & Fienberg, 2003) were employed for this linkage to account for and specify allowable discrepancies between values of the attributes. All probabilistic linkages were conducted using the Fine-Grained Record Linkage (FRIL) software v2.1.5.

### Measures

We operationalized the main exposure variable as any self-reported IPV occurring 12 months prior to or during pregnancy by combining four PRAMS questions (Table 1). We excluded Part "c" of the last question (see Table 1) which asked about IPV "Since my new baby was born." We specifically chose to limit our exposure window to only the time periods prior to the birth of the PRAMS sampled child for the following reasons:

**Table 1.** Exposure, Outcome, and Covariate Parameter Descriptions.

| Variable | Description |
|---|---|
| Outcome | |
| Maltreatment report | Any valid report made to Child Protective Services prior to age 2 years of the child birth from the time of survey completion |
| Exposure | |
| Intimate partner violence | Created by combing any "yes" response to four questions (with part "c" of Q4 excluded) from the Alaska PRAMS Phase 6 survey<br>PQ1 (standard): During the 12 months before you got pregnant with your new baby, did your husband or partner push, hit, slap, kick, choke, or physically hurt you in any other way?<br>PQ2 (standard): During your most recent pregnancy, did your husband or partner push, hit, slap, kick, choke, or physically hurt you in any other way?<br>PQ3 (Alaska-specific): During the 12 months before you got pregnant with your new baby, did you ever call the police because you felt threatened by your husband or partner? Include calls to 911, Alaska State Troopers, or Village Public Safety Officers (VPSOs).<br>PQ4 (standard): Did your husband or partner threaten you, limit activities against your will, or make you feel unsafe in any other way?<br>a. During the 12 months before you got pregnant<br>b. During your most recent pregnancy<br>c. Since your new baby was born. |
| Covariates | |
| Race | Determined as Alaska Native/American Indian if either maternal or paternal race on the birth record indicated such, otherwise classified as non-Native unless missing for both. |
| Maternal education | As indicated on the birth record where the categorical groups of 0–8 years, 9–11 years, 12 years, 13–15 years, and 16+ years were dichotomized to <12 years and 12+ years. |
| Maternal smoking | Created by combining information from the birth record and one question from PRAMS and dichotomized and as any smoking during pregnancy or no smoking.<br>Birth record: Any smoking during pregnancy indicated.<br>PQ1 (core): In the last 3 months of your pregnancy, how many cigarettes did you smoke on an average day? (A pack has 20 cigarettes.) |
| Maternal alcohol | Created by combining information from the birth record and one question from PRAMS and dichotomized and as any drinking during pregnancy or no drinking.<br>Birth record: Any drinking during pregnancy indicated.<br>PQ1 (core): During the last 3 months of your pregnancy, how many alcoholic drinks did you have in an average week? |
| Poverty | This poverty variable was created by combining two PRAMS questions and applying the 2010 federal poverty level (FPL) guidelines for Alaska found at http://aspe.hhs.gov/poverty/10poverty.shtml and dichotomized as below are at or above FPL.<br>PQ1 (core): During the 12 months before your new baby was born, what was your yearly total household income before taxes? Include your income, your husband's or partner's income, and any other income you may have received. (All information will be kept private and will not affect any services you are now getting.)<br>PQ2 (core): During the 12 months before your new baby was born, how many people, including yourself, depended on this income? |
| Marital status | As indicated on the birth record at the time of delivery. |
| Prenatal care | The APNCU index, as computed on the birth record file was utilized. Based on initial assessment inadequate and intermediate were combined and adequate and adequate plus were combined. |
| Maternal age | Maternal age at delivery as indicated in the birth record was utilized for this measure |

*Note.* PRAMS = pregnancy risk assessment monitoring system; APNCU = adequacy of prenatal care utilization; PQ = PRAMS Question.

First, prior research clearly documents the concurrence of IPV and CM. We are interested in isolating the time ordering of these events by focusing on prebirth exposures to IPV; while continuation or changes in IPV may be of interest, they are outside the scope of this study and specificity of the available data. Further, due to PRAMS sampling occurring 2–6 months after birth, self-reported exposures of IPV occurring after birth are time limited arbitrarily by survey completion. Due to PRAMS methodology, longitudinal assessment of events reported during the postbirth window occurs during the "immortal person-time" of child follow-up. Inclusion of this time period into the exposure classification could reduce the validity of the time ordering of events. Second, due to the low prevalence of the exposure (IPV), we had limited ability to explore variations in IPV exposure timing with the full adjustment set models.

We investigated all 3 exposure time windows to quantify any potential impact the classification definition might have on conclusions relative to the study hypothesis. We first examined the combination of the prebirth time periods, as the objective of this study is to assess prebirth IPV on subsequent postbirth reported maltreatment allegations of the PRAMS-birth child in a general population. We found that 6.6%$_w$

(95% confidence interval [CI] = [5.4, 7.8]%$_w$) reported IPV prior to pregnancy, 4.7%$_w$ (95% CI = [3.7, 5.7]%$_w$) during pregnancy, and 8.0%$_w$ (95% CI = [6.6, 9.3]%$_w$) prior to and/or during pregnancy. Among those self-reporting IPV during either of the prebirth time periods, 41.3% reported occurrences during both 12 months prepregnancy and during pregnancy time periods. The odds of reported CM were similar between both time periods (data not shown). Due to the similarities in the association with the outcome between these two prebirth exposure windows, improvement in precision, and applicability for targeted prevention efforts, combining these two time-periods is supported.

Next we conducted an ad hoc assessment of the exclusion of IPV reported between birth and survey completion on the outcome. This assessment revealed that among respondents reporting any IPV prepregnancy, during, or after ($n$ = 217), 13.4% reported IPV during all three time periods and 9.2% reported only postpregnancy IPV. We had no way of determining whether the postbirth IPV reported occurred before, at, or after the alleged maltreatment reported to CPS. Regardless, we investigated the crude relationship of reported maltreatment of IPV for all time periods and compared the respondent characteristic distributions. The odds of a CM report for those with sustained IPV (all three time periods), prebirth time periods, and postbirth only time periods were, respectively, 7.8 (95% CI = [2.9, 19.4]), 4.8 (95% CI = [3.1, 7.5]), and 3.4 (95% CI = [0.5, 13.9]). Continued or sustained IPV should be further investigated in subsequent research with more expansive data sets, as a differential predictive effect may be indicated. However, the characteristic distributions of PRAMS respondents reporting IPV were similar across all time periods.

Due to the ambiguity of the exposure in the postbirth and time sequencing relationship with reported CM, as well as the overall minimal effect differences detected between the prebirth IPV exposures, the operationalized definition of historic maternal (prenatal) IPV is supported for this study. Findings are reported by IPV exposure 12 months prior to pregnancy and/or during pregnancy, compared to no IPV reported during these periods.

For this study, we used any reported allegation of physical or sexual abuse, neglect, or mental injury (regardless of screening determination) made to the State of Alaska's CPS agency prior to age 2 years as the outcome of interest. Due to the left truncation of the study design, CM reports are limited to only those that occur after the PRAMS respondent completed the survey and prior to the second birthday of the PRAMS child. Runyan et al. demonstrated that reports to CPS are valid research proxies for maltreatment events (Runyan et al., 2005). From a policy perspective, focusing on CPS report allegations (as opposed to self-reported or observed behaviors) to measure maltreatment is a useful outcome to indicate system burden and need for targeted services. We combined both acts of omission and commission allegations by any specified caregiver (regardless of relationship) to focus on the outcome of interest to represent any contact with CPS as a victim. This general relationship will help elucidate the extent to which IPV can impact overall child rearing opposed to investigating individual causal pathways in the population.

The covariates maternal alcohol use, maternal educational attainment, maternal smoking status, maternal age, marital status, race, prenatal care, and poverty were available in the data and considered as potential confounders or effect measure modifiers. (See Table 1 for complete variable descriptions).

We categorized race as AN/AI and non-AN/AI (hereafter referred to as Alaska Native and non-Native, respectively) due to small numbers of other races and to reflect the predominate populations in Alaska.

Among the 2,389 PRAMS respondents, 77% have complete data on all considered covariates. Of the 556 respondents missing at least one covariate, 76% are missing only one, 17% are missing two, 5% are missing three, and 2% are missing four or more. No respondents in the study are missing all information on every covariate. Prenatal care had the single most missing information at 12%, followed by maternal education at 6%.

Father's race is missing among 19% (446 of 2,389) of the respondents. Due to the disparate distribution of missing fathers race among AN/AI population (28%), we conducted an extreme estimate sensitivity analysis to quantify the potential (but highly unlikely) degree of bias by including paternal race. Incident odd ratios of maltreatment reports comparing Alaska Native to non-Native yielded extreme bounds of 2.4–4.2 (all missing fathers race coded as non-Native, then Alaska Native, respectively), thus our race estimate using either the father or mothers race of 2.6 is likely a conservative estimate with effects attenuated toward the null with only 1%$_w$ missing race information completely (both maternal and paternal race missing).

## Statistical Analysis

We assessed univariate and bivariate distributions for all selected variables. Crude odd ratios and 95% CIs are presented. Maternal age, the one continuous variable considered, was assessed for fit using higher order polynomials.

Due to 23% of the respondents missing at least one covariate and both the outcome and exposure being rare (<10%), we conducted multiple imputations using Markov chain iterative regression methods based on the logit distribution (Schafer, 1999). The chained regressions were averaged together, and the standard errors were corrected using bootstrapping for the final regression model. We assessed all covariates for effect measure modification (EMM) through model interaction term assessment. EMM or statistical interaction is measure dependent (additive or multiplicative scale) and the effect between the exposure and outcome varies by the levels of some third variable; this may or may not represent biological interaction. The a priori significance for retaining interaction terms in the model was $\alpha = .15$. Variables with >10% change in the estimate were retained in the model as confounders. Finally, we assessed the validity precision trade off through assessment of the confidence limit ratio (upper 95% CI/lower 95% CI) between the reduced and full models.

Frequency counts are presented as actual participant responses and proportions are weighted results from the complex sampling design (noted as $\%_w$). All analyses were conducted in *R* 3.2.3 using the survey package. The current study was reviewed and approved by the University of North Carolina at Chapel Hill non-biomedical Institutional Review Board. The Alaska PRAMS project is reviewed by institutional review boards at the university of Alaska anchorage and the centers for disease control and prevention.

## Results

There were 2,389 PRAMS respondents during the 2009 and 2010 birth years in Alaska. On average, women responded to the PRAMS survey when their infant was 3.8 months old. Among respondents, 197 ($7.98\%_w$) self-reported a history of IPV either during or 12 months prior to pregnancy. There were 226 ($8.04\%_w$) children who experienced at least one report to CPS prior to age 2 years. We found that $6.5\%_w$ of the mothers with no history of IPV had the surveyed child reported to CPS by age 2, compared to $25.2\%_w$ of the mothers with a history of IPV. Additionally, approximately one quarter of all CPS reports occurred among children whose mothers reported IPV.

Univariate and joint distributions of the weighted sample between covariates and the exposure can be found in Table 2. The odds of a CM report by age 2 among children born to mothers reporting IPV is 4.84 (95% CI = [3.06, 7.52]) times that of children born to mothers without IPV. During bivariate testing, we detected EMM by race and by maternal education level. After controlling for marital status, poverty, maternal age, maternal smoking, and maternal alcohol use, the interaction between race and IPV attenuated ($p = .5$) and was removed from the model, whereas the interaction between maternal education and IPV remained significant ($p < .001$) and was retained in the final model. Among mothers with lower educational attainment (<12 years), the prevalence of reported IPV is $13\%_w$ and CM is $19\%_w$, whereas among the 12+ educated stratum, it is, respectively, $8\%_w$ and $7\%_w$. Within the 12+ years educated stratum, the odds of a CM report given no IPV exposure are 0.05, while the odds of a CM report given IPV exposure are 0.27. However, within the 12 years educated stratum, the odds of a CM report given no IPV exposure and given exposure are nearly identical at 0.23.

The final model retained all identified confounders due to no appreciable improvement in precision when subsets were removed. As indicated by the significant interaction (data not shown), the relationship between maternal IPV exposure and CM report varied by the level of maternal educational attainment. Among mothers with 12+ years education completed, the odds of a CM report for children whose mothers reported IPV are 3.88 (95% CI = [2.25, 6.71]) times that with no IPV. Among mothers with <12 years education completed, reported IPV had no effect on the odds of child welfare contact through a CM report (Table 3).

Common referent group comparisons for the exposure combinations of maternal education and IPV are further described to explore the relationship. Relative to the doubly unexposed (maternal education >12 years and no IPV), the singly exposed to either IPV or <12 years education and the doubly exposed (maternal education <12 years and IPV) had statistically equivalent relative odds of maltreatment reports by age 2 years (Table 4).

The association between IPV and the different forms of maltreatment was assessed in a post hoc analysis. The odds of a CM report for physical abuse by age 2 among mothers reporting IPV is 3.66 (95% CI = [0.89, 11.55]) times that of children born to mothers without IPV. The odds of a CM report for neglect by age 2 among mothers reporting IPV is 4.86 (95% CI = [3.03, 7.65]) times that of children born to mothers without IPV. The odds of a CM report for mental injury by age 2 among mothers reporting IPV is 5.25 (95% CI = [2.15, 11.78]) times that of children born to mothers without IPV. Due to small numbers, sexual abuse was excluded from this analysis.

## Discussion

Consistent with published research, we found IPV to be strongly associated with future reports to child welfare (Chan et al., 2012; McGuigan & Pratt, 2001; Taylor et al., 2009). An important contribution of this study is that it identifies the potential utility of broad IPV screening questions prior to and during pregnancy. In addition to focusing on a predictive association (as opposed to describing the causal etiology), this study provides key insights into the complexities of the relationship between IPV and CM and the role maternal education may play in this association. A significant strength of this study over prior research is the use of a population-based longitudinal sample from a statewide birth cohort linked with official reports of CM through 2 years of age and the use of general self-reported IPV occurring around the time of pregnancy.

In this population-based longitudinal study, we detected that the predictive association of prebirth maternal IPV on subsequent postbirth contact with CPS varies by maternal education level. The implications of this detected EMM require context to fully realize. Mothers with greater education are largely considered lower risk of experiencing IPV and having children reported for CM. In this population, we found consistent results, among mothers with 12+ years education, only $8\%_w$ reporting IPV and $7\%_w$ having a child reported for CM and $13\%_w$ experiencing IPV and/or CM, compared with $13\%_w$, $19\%_w$, and $33\%_w$, respectively, among mothers with <12 year's education. Mothers reporting <12 years education represented only 13% of the population but accounted approximately 30% of both reported IPV and CM reports. Among this subgroup, IPV appears to be a poor predictor of CM, as women in this category have an elevated baseline risk for both events. Likely, the factors that contribute to both IPV and CM are pronounced among this subgroup leading to nondifferential odds regardless of IPV exposure. While among women with higher education attainment the majority report experiencing neither IPV nor contact with CPS, in this case IPV accounts for 30% of the CM in this subgroup.

**Table 2.** Bivariate Description of Primary Exposure and Covariates by Outcome.[a]

| Variable | Total (%$_w$), $N = 2{,}389$ | Child Maltreatment Report by Age 2 Years | | OR [95% CI]$_w$ |
|---|---|---|---|---|
| | | No (%$_w$), $n = 2{,}163$ (92.0) | Yes (%$_w$), $n = 226$ (8.0) | |
| Primary exposure | | | | |
| Reported IPV | | | | |
| No | 2,160 (90.8) | 1,993 (92.3) | 167 (73.6) | 1 |
| Any | 197 (8.0) | 142 (6.5) | 55 (25.0) | 4.84 [3.06, 7.52] |
| Missing | 32 (1.2) | 28 (1.2) | 4 (1.4) | |
| Covariates | | | | |
| Marital status | | | | |
| Married | 1,406 (62.2) | 1,354 (65.7) | 52 (21.9) | 1 |
| Unmarried | 979 (37.8) | 806 (34.3) | 173 (78.1) | 6.81 [4.42, 10.50] |
| Missing | 4 (0.0) | 3 (0.0) | 1 (0.0) | |
| Below federal poverty level | | | | |
| No | 1,392 (62.5) | 1,345 (65.7) | 47 (25.6) | 1 |
| Yes | 865 (33.2) | 709 (30.5) | 156 (65.1) | 5.49 [3.53, 8.53] |
| Missing | 132 (4.3) | 109 (3.8) | 23 (9.3) | |
| Race | | | | |
| Nonnative | 1,375 (70.3) | 1,294 (72.0) | 81 (50.8) | 1 |
| Alaska Native | 917 (29.0) | 775 (27.2) | 142 (48.9) | 2.55 [1.78, 3.65] |
| Missing | 97 (0.7) | 94 (0.8) | 3 (0.3) | |
| Maternal education | | | | |
| 12+ years | 1,914 (83.9) | 1,772 (85.6) | 142 (64.4) | 1 |
| 0–11 years | 326 (12.6) | 255 (11.1) | 71 (30.6) | 3.67 [2.40, 5.60] |
| Missing | 149 (3.5) | 136 (3.3) | 13 (5.0) | |
| Maternal smoking | | | | |
| No | 1,866 (81.4) | 1,781 (83.8) | 105 (54.0) | 1 |
| Yes | 522 (18.6) | 402 (16.2) | 120 (45.9) | 4.41 [3.04, 6.39] |
| Missing | 1 (0.0) | 0 (0.0) | 1 (0.1) | |
| Maternal alcohol use | | | | |
| None | 2,166 (91.1) | 1,977 (91.3) | 189 (88.9) | 1 |
| Yes | 191 (8.1) | 158 (7.9) | 33 (10.6) | 1.39 [0.85, 2.26] |
| Missing | 32 (0.8) | 28 (0.8) | 4 (0.5) | |
| Prenatal care[b] | | | | |
| Adequate | 1,694 (72.9) | 1,548 (73.7) | 146 (64.3) | 1 |
| Inadequate | 401 (15.6) | 345 (14.6) | 56 (26.5) | 2.08 [1.36, 3.18] |
| Missing | 294 (11.5) | 270 (11.7) | 24 (9.2) | |

*Note.* IPV = intimate partner violence; *OR* = odd ratios; CI = confidence intervals.
[a]Presented as unweighted counts and sample weighted percent's, Number (%$_w$).
[b] Prenatal care specified by grouping Adequacy of Prenatal Care Utilization (APNCU) index levels.

**Table 3.** Full and Reduced Multivariable Logistic Regression By Maternal Education Level and Race.

| Maternal Education | Race | Full Model[a] aOR [95% CI]$_w$ | Final Model[b] aOR [95% CI]$_w$ |
|---|---|---|---|
| <12 Years | | | 0.93 [0.44, 1.98] |
| | Alaska native | 0.92 [0.41, 2.07] | |
| | Alaska nonnative | 0.93 [0.34, 2.57] | |
| 12+ Years | | | 3.88 [2.25, 6.71] |
| | Alaska native | 3.86 [1.97, 7.55] | |
| | Alaska nonnative | 3.91 [1.84, 8.30] | |

*Note.* IPV = intimate partner violence; aOR = Adjusted Odds Ratio; CI = confidence interval.
[a]Full model adjusted for maternal alcohol use, maternal education, maternal smoking, maternal age, marital status, race, poverty, maternal education × IPV and race × IPV. [b]Final model adjusted for maternal alcohol use, maternal education, maternal smoking, maternal age, marital status, race, poverty, and maternal education × IPV.

**Table 4.** Common Referent Group Comparison of Reported CM by Maternal Education and IPV.[a]

| Maternal Education <12 Years Completed | Reported Intimate Partner Violence | Odds Ratio [95%CI]; CLR[b] |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 7.51 [4.47, 12.61]; 2.82 |
| 1 | 0 | 5.26 [3.25, 8.51]; 2.62 |
| 1 | 1 | 5.07 [2.39, 10.73]; 4.49 |

*Note.* CM = child maltreatment; IPV = intimate partner violence; CLR = confidence limit ratio; CI = confidence interval.
[a]0 = *no*, 1 = *yes*. [b]Confidence limit ratio (upper CI/lower CI).

This study provides a unique insight into the association between IPV and CM by assessing maternal IPV occurring during a relatively short time window, 12 months prior to pregnancy and/or during pregnancy. This specified exposure

period may have a clear biological and/or sociological context. First, due to timing, the perpetrator of the violence may be more likely to be residing in the home or have increased contact with the child after birth. Furthermore, maternal resentment toward the perpetrator may be transferred to the child or the child may become a reminder of the perpetrator and IPV, increasing the risk of violence against the child. Second, it is plausible that the violence directed at the mother could increase during the pregnancy (although this was not observed in these data) for reasons related to the possible unintended nature of the pregnancy, relationship dissatisfaction, and other issues, such as increased stress, and subsequently transmitted to the child after birth. Ultimately, IPV may interfere with protective factors in general. The focus of this study on IPV exposure during pregnancy and prior to pregnancy suggests the possibility that IPV could interfere with time-sensitive processes that would ordinarily protect against CM. It has been suggested that recent IPV interferes with maternal preoccupation or the capacity of the mother to attune to the newborn and form healthy attachments (Osofsky & Fenichel, 1994).

Evidence from the ad hoc analysis suggests that sustained IPV occurring prepregnancy and after may substantially increase the odds of contact with child welfare through a CM report. Additional research is needed to understand this complex relationship as this was outside the scope of this population-based predictive assessment and beyond the specificity of the data. It appears, however, that women reporting IPV prior to the birth of a child regardless of whether it is sustained is a strong overall predictor of subsequent contact with child welfare.

Although violence is often multifaceted, it appears that at least for children whose mothers have completed 12 or more years of education in Alaska, a maternal history of IPV may be a strong independent predictor of a child being reported to child welfare by age 2 years.

We found no predictive association among mothers with lower educational attainment (<12 years). Among this stratum, regardless of IPV exposure, the odds of a subsequent CM report remained elevated at 0.23. This somewhat counterintuitive result is likely attributable to the complex stressors and overall elevated baseline risk of both IPV and child welfare contact among these mothers with lower educational attainment (Desai & Alva, 1998). The prevalence of self-reported IPV and reported CM among this stratum is, respectively, 19.0% and 19.1% compared to 6.0% and 7.0%, respectively, among the 12+ education stratum. Clearly, this stratum maintains an overall elevated baseline risk and likely has multiple contributing factors associated with experiencing both IPV and CM.

There is emerging evidence that mothers with IPV-related posttraumatic stress disorder have different brain activation responses to their own infants, which is associated with reduced maternal sensitivity (Swain et al., 2014). In this line of reasoning, IPV prior to birth could impair the development of protective factors more likely to develop in homes that have an overall lower risk of CM (i.e., higher educational attainment). In homes with preexisting risk factors (i.e., lower educational attainment), these protective factors may be already impaired, making IPV exposure a poor predictor of subsequent CM.

Finally, it should be considered that the stratum difference observed by maternal education level could also be that educated mothers may have more resources and resiliency to seek help and supports. In contrast to the lack of attachment, an increase in protection could occur among these mothers or among the families and social connections. These mothers may act to protect their child by seeking help and thus increase the CM reports, resulting in the differential detection bias. Higher educational attainment has been shown to protect against both IPV and CM, thus the relationship of the predictive association observed in this study is of particular interest. However, the potential for stigma, social demand, and high potential for denial among this lower risk population limit the extent to which this explanation can likely be justified. Clearly, additional research is needed to detangle this complex relationship and further assess the relationship between IPV and CM among lower risk populations to explore causal pathways and systems influence leading to increased contact with child welfare.

### Limitations

Although this study has many strengths, including the prospective study design, use of the PRAMS population with sampling weights, ability to control for various difficult to measure confounders, and linkage between the PRAMS data, vital records, and CPS records, a few limitations are apparent. First, various survey biases such as recall, social desirability, and nonresponse are likely among the PRAMS population. We attempted to quantify possible systematic bias by conducting multiple imputations, testing extreme scenarios, and combining multiple measures on the survey. Second, like many maltreatment studies, this study was unable to control for confounders associated with the male partner and is a limitation of the inferences made. Third, all confounders were treated as time-invariant confounders as measured on the PRAMS survey. This is problematic due to the dynamic nature with which these cofactors interact and change over time. It is anticipated that this will minimally impact the conclusions but does remove the ability to adequately adjust for the complete influence of the confounder. Fourth, adoptions or other name changes could impact linkage quality, however less than 2% of the cohort experienced an adoption. Fifth, the data are left truncated due to the delay from birth to survey completion, thus excluding outcomes observed during this window. Any misclassification however would likely attenuate the results toward the null. Sixth, the nature of the IPV questions on the PRAMS survey is limiting, no information on frequency or severity of IPV is available. Additionally, due to small numbers, we collapsed variables and treated IPV as a dichotomous exposure. Also, we defined the exposure as any prebirth IPV report regardless of postbirth IPV which could impact the predictive results on CM, however the effect was nearly identical with inclusion or exclusion (odd ratios = 4.8 and 4.7, respectively), thus we opted to maintain

the larger numerator to maintain precision. Finally, although we attempted to assess maternal depression, the questions available were limited in scope. They focused solely on postpartum forms of depression and were therefore excluded.

## Conclusion

The association between maternal IPV experienced prior to or during pregnancy and subsequent postbirth child welfare reports by age 2 years suggests the importance of prenatal IPV screening as a method for detecting the risk for future contact with child welfare of maternal offspring. Prenatal care provides a ''window of opportunity'' for this screening, since there are numerous prenatal visits, which allow providers and their staff to build trusting relationships with their patients. This trust may make women more comfortable disclosing IPV and increase receptivity to assistance and services.

The somewhat counterintuitive finding of this study, that IPV and subsequent postbirth maternal offspring child welfare reports are present in homes with more highly educated mothers, is significant for prevention efforts. It suggests that IPV screening is especially useful for this subgroup, a subgroup that practitioners might be likely to overlook due to an overall perceived lower risk. This highlights the potential utility of universal screening as opposed to selective screening, as it could mitigate erroneous screening selection. The U.S. Preventative Services Task Force has highlighted the benefits of IPV screening and new guidelines under the Affordable Care Act require IPV screening and counseling as part of the essential women's health benefits (Liebschutz & Rothman, 2012). Screening and assessment in health care settings are important steps toward primary prevention, especially during prepregnancy and pregnancy. Increased sensitivity to familial violence and trauma during this period should be initiated by health care providers to support overall health and development. However, in resource-limited communities and in large geographic states, the lack of availability and access to effective violence-related interventions (Dubowitz, Feigelman, Lane, & Kim, 2009; Kiely, El-Mohandes, El-Korazaty, Blake, & Gantz, 2010) for women who screen positive may limit the benefits of this strategy overall (MacMillan et al., 2009).

In Alaska, due to the geographical expanse, medical and other health care providers often have limited direct contact with mothers, children, and families. It is therefore imperative to identify individuals and families at key time points, where increased contact with health care providers occurs (e.g., pregnancy). Using broad screening questions to identify individuals and families that are potentially at increased risk of subsequent maltreatment could inform targeted and intensive primary prevention efforts. With the centralization of services, nearly all births in Alaska are delivered in urban or hub communities, making this time a key window for prevention efforts.

More complete screening for risk factors including familial violence is needed during prenatal care through birth, when physicians and other health professionals potentially have high impact contact with women and children. Although this study suggests that the development and implementation of effective IPV programs may have benefits that extend to the child's well-being, ultimately, more comprehensive interventions addressing the multifaceted influences of both IPV and CM are needed to expect the greatest public health impact.

### Authors' Note

The corresponding author is both a doctoral student at the University of North Carolina and an employee of the Alaska Division of Public Health (ADPH). The ADPH requires all manuscripts to be reviewed by an executive leadership committee. No other potential conflicts of interest are noted. The data used for this analysis can be accessed by contacting the Alaska Division of Public Health MCH-Epidemiology Unit. Surveillance of Child Abuse and Neglect (SCAN) program manager maintains the research dataset created. The final models developed are available from the primary author upon request. All data access require completion of necessary data access requirements by the State of Alaska Department of Health and Social Services.

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### References

AlEissa, M. A., Fluke, J. D., Gerbaka, B., Goldbeck, L., Gray, J., Hunter, N., . . . Tonmyr, L. (2009). A commentary on national child maltreatment surveillance systems: Examples of progress. *Child Abuse & Neglect*, *33*, 809–814.

Bowen, E., Heron, J., Waylen, A., & Wokle, D., & ALSPAC Study Team. (2005). Domestic violence risk during and after pregnancy: Findings from a British longitudinal study. *BJOG: An International Journal of Obstetrics and Gynaecology*, *112*, 1083–1089.

Breiding, M. J., Chen, J., & Black, M. C. (2014). *Intimate partner violence in the United States - 2010*. Atlanta, GA: National Center for Injury Prevention and Control, Centers for Disease Control and Prevention.

Brown, D. S., Fang, X., & Florence, C. S. (2011). Medical costs attributable to child maltreatment a systematic review of short- and long-term effects. *American Journal of Preventive Medicine*, *41*, 627–635.

Buckingham, E. T., & Daniolos, P. (2013). Longitudinal outcomes for victims of child abuse. *Current Psychiatry Reports*, *15*, 342.

Burch, R. L., & Gallup, G. G. Jr. (2004). Pregnancy as stimulus for domestic violence. *Journal of Family Violence*, *19*, 243–247.

Casanueva, C., & Martin, S. (2007). Intimate partner violence during pregnancy and mothers' child abuse potential. *Journal of Interpersonal Violence*, *22*, 603–621.

Chan, K. L., Brownridge, D. A., Fong, D. Y., Tiwari, A., Leung, W. C., & Ho, P. C. (2012). Violence against pregnant women can increase the risk of child abuse: A longitudinal study. *Child Abuse & Neglect*, *36*, 275–284.

Cohen, W. W., Ravikumar, P. D., & Fienberg, S. E. (2003). A comparison of string distance metrics for name-matching tasks. *Proceedings of the IJCAI-2003 Workshop on Information Integration on the Web (IIWeb-03)*, 73–78. Retrieved from November 6, 2015, https://www.cs.cmu.edu/~pradeepr/papers/ijcai03.pdf

Coker, A. L., Davis, K. E., Arias, I., Desai, S., Sanderson, M., Brandt, H. M., ... Smith, P. H. (2002). Physical and mental health effects of intimate partner violence for men and women. *American Journal of Preventive Medicine*, *23*, 260–268.

Cowart, M. A. (2012). *The effects of intimate partner violence on child maltreatment risk: Exploring moderators and mediators* (Master's Thesis). Retrieved from ScholarWorks @ Georgia State University http://scholarworks.gsu.edu/cgi/viewcontent.cgi?article=1260&context=iph_theses

Desai, S., & Alva, S. (1998). Maternal education and child health: Is there a strong causal relationship? *Demography*, *35*, 71–81.

Dube, S. R., Anda, R. F., Felitti, V. J., Edwards, V. J., & Williamson, D. F. (2002). Exposure to abuse, neglect, and household dysfunction among adults who witnessed intimate partner violence as children: Implications for health and social services. *Violence and Victims*, *17*, 3–17.

Dubowitz, H., Feigelman, S., Lane, W., & Kim, J. (2009). Pediatric primary care to help prevent child maltreatment: The safe environments for every kid (SEEK) model. *Pediatrics*, *123*, 858–864.

Dutton, M. A., Green, B. L., Kaltman, S. I., Roesch, D. M., Zeffiro, T. A., & Krause, E. D. (2006). Intimate partner violence, PTSD, and adverse health outcomes. *Journal of Interpersonal Violence*, *21*, 955–968.

Edleson, J. L., Mbilinyi, L. F., Beeman, S. K., & Hagemeister, A. K. (2003). How children are involved in adult domestic violence: Results from a four city telephone survey. *Journal of Interpersonal Violence*, *18*, 18–32.

Ewigman, B., Kivlahan, C., & Land, G. (1993). The Missouri child fatality study: Underreporting of maltreatment fatalities among children younger than five years of age, 1983 through 1986. *Pediatrics*, *91*, 330–337.

Gelles, R. J. (2000). Estimating the incidence and prevalence of violence against women national data systems and sources. *Violence Against Women*, *6*, 784–804.

Guo, S. F., Wu, J. L., Qu, C. Y., & Yan, R. Y. (2004). Physical and sexual abuse of women before, during, and after pregnancy. *International Journal of Gynecology & Obstetrics*, *84*, 281–286.

Hamby, S., Finkelhor, D., Turner, H., & Ormrod, R. (2010). The overlap of witnessing partner violence with child maltreatment and other victimizations in a nationally representative survey of youth. *Child Abuse & Neglect*, *34*, 734–741.

Herrenkohl, T. I., Sousa, C., Tajima, E. A., Herrenkohl, R. C., & Moylan, C. A. (2008). Intersections of child abuse and children's exposure to domestic violence. *Trauma, Violence, & Abuse*, *9*, 84–99.

Kaess, M., Parzer, P., Mattern, M., Plener, P. L., Bifulco, A., Resch, F., ... Brunner, R. (2013). Adverse childhood experiences and their impact on frequency, severity, and the individual function of nonsuicidal self-injury in youth. *Psychiatry Research*, *206*, 265–272.

Kendall-Tacket, K. A. (2007). Violence against women and the perinatal period: The impact of lifetime violence and abuse on pregnancy, postpartum, and breastfeeding. *Trauma, Violence, & Abuse*, *8*, 344–353.

Kiely, M., El-Mohandes, A. A., El-Korazaty, M. N., Blake, S. M., & Gantz, M. G. (2010). An integrated intervention to reduce intimate partner violence in pregnancy: A random controlled trial. *Obstetrics and Gynecology*, *115*, 273–283.

Liebschutz, J. M., & Rothman, E. F. (2012). Intimate-partner violence—what physicians can do. *New England Journal of Medicine*, *367*, 2701–2703.

MacMillan, H. L., Wathen, C. N., Jamieson, E., Boyle, M. H., Shannon, H. S., Ford-Gilboe, M., ... Campbell, J. C. (2009). Screening for intimate partner violence in health care settings: A randomized trial. *Journal of the American Medical Association*, *302*, 493–501.

Martin, S. L., Mackie, L., Kupper, L. L., Buescher, P. A., & Moracco, K. E. (2001). Physical abuse of women before, during, and after pregnancy. *Journal of the American Medical Association*, *285*, 1581–1584.

McGuigan, W. M., & Pratt, C. C. (2001). The predictive impact of domestic violence on three types of child maltreatment. *Child Abuse & Neglect*, *25*, 869–883.

Nicklas, E., & Mackenzie, M. J. (2013). Intimate partner violence and risk for child neglect during early childhood in a community sample of Fragile families. *Journal of Family Violence*, *28*, 17–29.

Norman, R. E., Byambaa, M., De, R., Butchart, A., Scott, J., & Vos, T. (2012). The long-term health consequences of child physical abuse, emotional abuse, and neglect: A systematic review and meta-analysis. *PLoS Medicine, 9*, e1001349.

Osofsky, J. D., & Fenichel, E. (1994). *Caring for infants and toddlers in violent environments: Hurt, healing, and hope*. United Kingdom: ERIC.

Parrish, J. W., & Gessner, B. D. (2010). Infant maltreatment-related mortality in Alaska: Correcting the count and using birth certificates to predict mortality. *Child Abuse & Neglect*, *34*, 951–958.

Parrish, J. W., Young, M. B., Perham-Hester, K. A., & Gessner, B. D. (2011). Identifying risk factors for child maltreatment in Alaska: A population-based approach. *American Journal of Preventive Medicine*, *40*, 666–673.

Renner, L. M., & Slack, K. S. (2006). Intimate partner violence and child maltreatment: Understanding intra- and intergenerational connections. *Child Abuse & Neglect*, *30*, 599–617.

Rosay, A. (2011). *Alaska victimization survey*. Paper presented at the Joint Meeting of Senate Judiciary Committee and Senate Health and Social Services Committee, Alaska state legislature, University of Alaska anchorage, Juneau, AK.

Rosay, A. M. L. (2010). *Intimate partner violence and sexual violence in the state of Alaska: Key results from the 2010 Alaska victimization survey*. Retrieved from http://justice.uaa.alaska.edu/research/2010/1004.avs_2010/1004.07a.statewide_summary.pdf

Runyan, D. K., Cox, C. E., Dubowitz, H., Newton, R. R., Upadhyaya, M., Kotch, J. B., Leeb, R. T., ... Knight, E. D. (2005). Describing

maltreatment: Do child protective service reports and research definitions agree? *Child Abuse & Neglect*, *29*, 461–477.

Schafer, J. L. (1999). Multiple imputation: A primer. *Statistical Methods in Medical Research*, *8*, 3–15.

Sedlak, A. J., Mettenburg, J., Basena, M., Peta, I., McPherson, K., & Greene, A. (2010). *Fourth national incidence study of child abuse and neglect (NIS-4)*. Washington, DC: US Department of Health and Human Services. Retrieved from July 9, 2010, http://www.acf.hhs.gov/sites/default/files/opre/nis4_report_congress_full_pdf_jan2010.pdf

Sharps, P. W., Laughon, K., & Giangrande, S. L. (2007). Intimate partner violence and the childbearing year: Maternal and infant health consequences. *Trauma, Violence, & Abuse*, *8*, 105–116.

Shulman, H. B., Gilbert, B. C., Msphbrenda, C. G., & Lansky, A. (2006). The pregnancy risk assessment monitoring system (PRAMS): Current methods and evaluation of 2001 response rates. *Public Health Reports (Washington, D.C.: 1974)*, *121*, 74–83.

Silverman, J. G., Decker, M. R., Reed, E., & Raj, A. (2006). Intimate partner violence victimization prior to and during pregnancy among women residing in 26 US states: Associations with maternal and neonatal health. *American Journal of Obstetrics and Gynecology*, *195*, 140–148.

Swain, J., Kim, P., Spicer, J., Ho, S., Dayton, C., Elmadih, A., … Abel, K. (2014). Approaching the biology of human parental attachment: Brain imaging, oxytocin and coordinated assessments of mothers and fathers. *Brain Research*, *1580*, 78–101.

Taylor, C. A., Guterman, N. B., Lee, S. J., & Rathouz, P. J. (2009). Intimate partner violence, maternal stress, nativity, and risk for maternal maltreatment of young children. *American Journal of Public Health*, *99*, 175–183.

Tjaden, P., & Thoennes, N. (2000). *Extent, nature, and consequences of intimate partner violence: Findings from the national violence against women survey*. Washington, DC: National Institute of Justice.

U.S. Department of Health and Human Services, Administration for Children and Families, Administration on Children, Youth and Families, Children's Bureau. (2015). *Child maltreatment 2013*. Retrieved from http://www.acf.hhs.gov/programs/cb/research-data-technology/statistics-research/child-maltreatment

Waltermaurer, E. (2005). Measuring intimate partner violence (IPV) you may only get what you ask for. *Journal of Interpersonal Violence*, *20*, 501–506.

Wildeman, C., Emanuel, N., Leventhal, J. M., Putnam-Hornstein, E., Waldfogel, J., & Lee, H. (2014). The prevalence of confirmed maltreatment among US children, 2004 to 2011. *JAMA Pediatrics*, *168*, 706–713.

Zolotor, A. J., Motsinger, B. M., Runyan, D. K., & Sanford, C. (2005). Building an effective child maltreatment surveillance system in North Carolina. *North Carolina Medical Journal*, *66*, 360–363.

Zolotor, A. J., Theodore, A. D., Coyne-Beasley, T., & Runyan, D. K. (2007). Intimate partner violence and child maltreatment: Overlapping risk. *Brief Treatment and Crisis Intervention*, *7*, 305.