Prevalence and Risk Factors for Early Motherhood Among Low-Income, Maltreated, and Foster Youth

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Abstract

Early childbearing is associated with a host of educational and economic disruptions for teenage girls and increased risk of adverse outcomes for their children. Low-income, maltreated, and foster youth have a higher risk of teen motherhood than the general population of youth. In this study, we assessed differences in the risk of early motherhood among these groups and investigated whether differences likely reflect selection factors versus effects of involvement with Child Protective Services (CPS) or foster care. Using a statewide linked administrative data system for Wisconsin, we employed survival analysis to estimate the hazard of early birth (child conceived prior to age 18) among females. We found that both the youth involved in CPS and youth in foster care were at significantly higher risk of early motherhood than low-income youth, and these differences were not explained by a range of sociodemographic and family composition characteristics. Moreover, our findings indicate that CPS and foster care are unlikely to be causal agents in the risk of early motherhood: among foster youth, risk was lower during foster care compared with before; among CPS-involved girls, risk was the same or lower after CPS investigation compared with before. Subsequent analysis showed that after girls exited foster care, those who were reunified with their birth families were at higher risk than those placed in adoption or guardianship. Overall, our findings suggest that whereas CPS and foster youth are high-risk populations for early motherhood, CPS involvement and foster care placement do not exacerbate, and may instead reduce, risk.

Keywords

Early parenthood; Poverty; Child protective services; Foster care

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Introduction

Early childbearing is associated with a host of educational and economic disruptions for young adults (Hoffman et al. 1993; Kane et al. 2013) and with increased risk of adverse developmental outcomes for their offspring (Hoffman et al. 1993; Pogarsky et al. 2006). Both the risk of early parenthood and the associated consequences are greater for young women than men (Abele and Spurk 2011; Woodward et al. 2006) and for low-income youth than their higher-income peers (Berzin and De Marco 2010; Penman-Aguilar et al. 2013). Thus, early parenthood—particularly motherhood—is an important factor associated with intergenerational inequalities by social class and gender (Paranjothy et al. 2009). Although the magnitude of causal association of teen parenthood with parent educational or economic outcomes (Hotz et al. 2005; Lee 2010) or their children's developmental outcomes (Levine et al. 2007) remains disputed, early childbearing is an important indicator of risk.

Children and youth involved in the Child Protective Services (CPS) system, some of whom experience foster care placement, are a large, important, and policy-relevant subpopulation of those at risk for early parenthood for at least three reasons. First, a substantial proportion of children and youth, particularly those from disadvantaged families, experience CPS involvement and foster care placement. Current estimates indicate that 37 % of all U.S. children and more than one-half of black children are involved in CPS investigations [before age 18 (Kim et al. 2017). In addition, 6 % of all U.S. children and 12 % of black children experience one or more foster care placements by age 18 (Wildeman and Emanuel 2014). Thus, the CPS system touches a large number of U.S. children, especially those from low-income and black families.

Second, elevated risk of teen pregnancy and birth have been documented among youth involved with CPS, both those who remain in home and those who experience foster care (Brännström et al. 2015; Carpenter et al. 2001; Doyle 2007; Putnam-Hornstein and King 2014). Teen pregnancy risk is particularly high for girls who age out of foster care (Dworsky and Courtney 2010; Havalchak et al. 2007; Matta Oshima et al. 2013; Shpiegel et al. 2017). Based on a sample of Illinois teenaged girls involved with CPS or foster care, Doyle (2007) reported that 35 % had a teen birth. According to King (2017), 18 % and 20 % of CPS and foster care girls, respectively, had a teen birth in a California cohort. Other studies have focused on subpopulations of foster youth, finding that approximately 55 % of female youth who age out of foster care (i.e., reach the age of majority while still in care) have a teen pregnancy (Matta Oshima et al. 2013), and 21 % have a teen birth (Shpiegel et al. 2017). Comparing these figures with the general population is difficult, given the differences in year, geography, and other factors. Nevertheless, studies making direct comparisons have found that girls involved in CPS or in foster care are two to three times as likely to become teen mothers, relative to the general population (Noll and Shenk 2013; Shaw et al. 2010). Moreover, King et al. (2014) cited evidence that the incidence of teen births to youth in foster care has not declined, despite large declines in teen births overall. Importantly, most of the figures reported in the extant literature pertain to births prior to age 20, and more than 72 % of teen births are to females ages 18 or 19 (Kost et al. 2017). Yet, entering motherhood by age 18 is likely to be an especially difficult experience because of the increased likelihood of disrupting high school graduation and the barriers to employment and

independent living that minors face. Births to minors are also particularly relevant to understanding potential CPS and foster care influences, given that the child welfare system cannot involuntarily intervene in the lives of (childless) youth after their 18th birthday.

Third, CPS is mandated to promote safety, permanency, and well-being for the children and youth in its care, particularly those who experience foster care placement, for whom the state assumes either temporary or permanent custody. In light of considerable evidence documenting that births to young mothers are, on average, associated with a wide range of adverse outcomes throughout the life course for both these mothers and their children (Hoffman et al. 1993; Pogarsky et al. 2006), links between CPS involvement—and, especially, foster care placement and teen pregnancy—are salient for public policy *vis-à-vis* this large group of disadvantaged children and youth.

Whereas multiple studies have documented early births to young women involved with CPS, experiencing foster care, or aging out of care, research has shed relatively little light on whether the associations of CPS involvement and foster care placement with greater risk of early childbirth are likely to be causal or, instead, to primarily reflect social selection given that the CPS population is drawn from particularly disadvantaged families. Furthermore, prior studies have not examined the extent to which early births to CPS-involved females occur before, during, or after system involvement or foster care placement, which would provide additional insight into temporal nature of associations. Although we are unable to fully address all concerns related to selection bias, we begin to address these gaps by using survival analysis and extensive administrative data to estimate the prevalence of, and identify risk factors for, births conceived between ages 13 and 17. Our data include the full population of female youth in Wisconsin who experienced foster care, experienced CPS involvement but were never placed in foster care, or were in an economically disadvantaged family that received Supplemental Nutrition Assistance Program (SNAP; formerly *Food Stamps*) benefits but experienced neither CPS involvement nor foster care. Our analyses also consider the timing of CPS involvement and foster care placement *vis-à-vis* the timing of conception and control for a considerable range of observable sociodemographic characteristics of these children and their families.

CPS Involvement, Foster Care, and Early Motherhood

Despite a number of studies showing a high prevalence of teen motherhood among girls involved with CPS or foster care, comparatively little evidence is available as to factors that may explain differential risk. In particular, three interrelated sets of factors are likely to confound associations of child maltreatment and foster care with early motherhood: poverty, family structure and formation, and family functioning.

First, higher levels of poverty among CPS and foster youth than youth in the general population may explain heightened risk of early motherhood among the former. Despite declines in teen births overall, significant socioeconomic gaps remain in teen pregnancy and birth (Kearney and Levine 2007), with low-income females more likely to have an unintended pregnancy and to carry an unintended pregnancy to term (Finer and Zolna 2016). Youth from low-income families initiate sex earlier and are less likely to use contraception,

leading to a higher risk of early motherhood (Kalmuss et al. 2003; Penman-Aguilar et al. 2013). Most youth involved with CPS or who enter foster care are from low-income families (Dolan et al. 2011; Lindsey 1991). Thus, high rates of teen birth among these youth, relative to the general population of youth, are consistent with poverty-based risk patterns. In addition, economic and educational attainment follow intergenerational patterns in the transmission of not only resources and ability but also values and expectations (Carolan and Wasserman 2015; Davis-Kean 2005). Low-income, maltreated, and foster youth are less likely to attend high-quality schools and to have parents with the social and economic resources to invest in education; they also tend to exhibit lower educational performance than children in the general population (Berger et al. 2015; Reardon et al. 2012; Reardon 2011; Stone 2007), which suggests a lower opportunity cost of early parenthood than for those on positive educational or career trajectories (Plotnick 2007). Indeed, studies of the Swedish child welfare population have concluded that school failure explains a large proportion of the heightened risk of teen birth among child welfare system– involved girls (Brännström et al. 2015, 2016). If heightened risk of early motherhood among CPS-involved and foster youth is driven by poverty-related disparities, then we should expect no differences in risk between these youth and similarly low-income youth without CPS or foster care involvement when controlling for various aspects of poverty exposure.

Second, family structure and context are consistently linked with teen pregnancy and birth. CPS-involved youth are disproportionately likely to have mothers who birthed them at a young age and to live in a single-parent household (Stith et al. 2009). Prior research has shown that females raised by single parents are more likely to have early, unmarried births (Hofferth and Goldscheider 2010), and those born to teen mothers are more likely to have early sexual activity and to become teen mothers themselves (De Genna et al. 2011; Meade et al. 2008). Given the relationship between early birth and socioeconomic disadvantage, as well as intergenerational transmission of disadvantage, this is not surprising. In addition, through social learning, teens may internalize beliefs and expectations about sexual activity, contraception use, and family formation that are conducive to early pregnancy and birth. If heightened risk among CPS and foster youth is largely attributable to differences in family contexts, then after accounting for the youth's exposure to early and nonmarital childbearing and other measures of family context, we would expect to observe no differences in early motherhood for CPS and foster youth compared with low-income youth in general.

Third, CPS involvement and foster care entry are more likely to occur in chaotic family environments, which may include domestic violence, substance abuse, mental health problems, inadequate supervision, and low-quality parenting. Child maltreatment, which often precipitates both CPS involvement and foster care placement, is an indicator of dysfunctional or harmful parent–child relationships. Qualitative work has suggested that teens and young adults with weakened family connections find purpose and fulfillment in motherhood (Connolly et al. 2012; Svoboda et al. 2012) and may perceive a pregnancy as an opportunity to build the family they wanted but never had (Chase et al. 2006).[1] If CPS involvement and foster care are confounded by such antecedent environmental factors, then

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[1]Although the majority of teen births are unplanned, an estimated 23 % of births to women ages 15 to 19 were intended at conception (Mosher et al. 2012).

we would expect that the age-adjusted risk of early motherhood among those who ever experienced CPS involvement or foster care would be the same before and after documented experiences of CPS investigation and foster care.

Potential Differential Effects of CPS Involvement and Foster Care Placement on Teen Motherhood

Families typically become involved with CPS because of allegations of abuse or neglect. Following an investigation of the alleged maltreatment, CPS may choose to provide no follow-up or intervention, to provide or refer families to in-home services, or to request the placement of a child in out-of-home care (typically in addition to providing services to parents). Services provided to parents generally target parental functioning (e.g., substance abuse or mental health treatment, parenting classes) or economic resources. The extent to which such interventions improve family functioning, much less child well-being, is not well demonstrated. In Wisconsin in 2016, approximately 15 % of investigated children were maltreatment victims, 43 % of whom were provided with family services; among children with unsubstantiated cases, approximately 7 % received services (U.S. Department of Health and Human Services 2017). Thus, even if intervention services were an effective mechanism for decreasing social risk factors for teen motherhood, we do not expect strong protective effects of CPS involvement, overall, given the comparatively low rate of intervention.

Foster care is arguably the most intensive intervention used by CPS. In Wisconsin, 39 % of children with substantiated cases and 7 % of children with unsubstantiated cases received foster care services in 2016 (U.S. Department of Health and Human Services 2017). Foster care placement can also result from other concerns related to family functioning, such as child behavioral or mental health concerns that exceed parental capacity. The effects of foster care have been of long-standing interest to researchers and policy-makers alike. Foster care provides a far greater degree of supportive services to children than they would otherwise receive if left in the home following maltreatment (Berger and Font 2015). These services, which can include behavioral and mental health treatment, general health care, and academic support, may improve individual functioning and reduce risk behaviors leading to pregnancy and subsequent childbirth. At the same time, foster care constitutes a severe strain on familial bonds—not just with parents, but also with siblings and extended family. To the extent that children in foster care, particularly those with unstable placement arrangements, may have further diminished family connections, they may experience higher risk of early motherhood than CPS-involved youth who remain in the home. On the other hand, when foster children are in stable high-quality placements, they may have more support as well as access to greater social, educational and economic resources, and thus may be at lower risk. Because hypotheses regarding the effects of foster care largely emphasize relationships, stability, and resources, risk of early motherhood is likely to differ before, during, and after placement. Moreover, in considering the relationship between teen pregnancy and general CPS services, compared with foster care placement, it is important to consider that approximately one-half of children exiting foster care are reunified with their biological parents, typically after spending less than a year in care (U.S. Department of Health and Human Services 2013).

A few studies have attempted to identify the effect of foster care on teen births, and we focus specifically on those that use CPS or otherwise high-risk comparison groups. King (2017) used a statewide California population of CPS-involved youth, comparing those who ever experienced foster care with those with substantiated CPS investigations but no foster care. King's findings indicated that foster care was associated with a 10 % higher rate of having a first birth before age 20. Brännström and colleagues (2016) investigated births at ages 17–19 in a Swedish cohort and concluded that differences between girls who had received in-home child welfare services and girls who had received out-of-home child welfare services were largely explained by selection characteristics, with the exception of girls who entered foster care in adolescence (who were at heightened risk even after adjustment for observed differences). And Doyle (2007) used an instrumental variables strategy with CPS-involved youth in Cook County (Chicago), IL and concluded that girls who experienced foster care were roughly twice as likely to have a birth before age 18 as maltreated girls who remained at home. (Notably, as is common in instrumental variables approaches, his findings were not statistically significant.) All these studies, however, focused only on whether a child ever experienced foster care; none considered whether the births were conceived before, during, or after foster care, or variability in the experiences of the foster youth.

The Current Study

Although numerous studies have linked early motherhood to family environment and parenting experiences (Harden et al. 2009; Hofferth and Goldscheider 2010; Imamura et al. 2007; Miller et al. 2001), most have focused on girls reared in biological family settings and have not specifically considered maltreatment and foster care experiences. Studies that have focused on maltreated girls or girls in foster care have generally estimated within-group prevalence and risk factors rather than considering change in or timing of risks (Dworsky and Courtney 2010; Helfrich and McWey 2014; King 2017; Noll and Shenk 2013; Putnam-Hornstein and King 2014) over the course of youths' trajectories through the CPS system, limiting the ability to address selection bias and temporal ordering.

To begin to address these gaps, we examined risk of *early motherhood*, which we define as any birth in which the child was conceived before adulthood (at ages 13 to 17), among three groups, accounting for a range of sociodemographic attributes: low-income girls, girls with CPS involvement (but no foster care), and girls who experienced foster care. We focus on births that were conceived before age 18 for two reasons. First, after a youth reaches age 18, the CPS and foster care systems have no authority to intervene; also, youths may reside independently, without parental oversight. Thus, prior to age 18 is the period wherein the family unit has the most influence over youth behavior. Second, girls who become pregnant before age 18 typically have yet to complete their high school education and are thus particularly vulnerable to low educational attainment and consequent economic disparities. Perper et al. (2010) estimated that only 38 % of girls who give birth before age 18 receive a high school diploma by age 22 compared with 60 % of those with births at ages 18 or 19.

To better understand the influence of maltreatment and foster care experiences on these risks, we specifically focused on the timing of CPS and foster care involvement relative to the estimated time of conception (approximated at nine months prior to a birth). Notably,

youth risky behaviors may trigger involvement with CPS or placement in foster care—either because it brings preexisting maltreatment to the attention of CPS or because youth behavior issues are themselves a motivation for placement. For example, a young girl's pregnancy may be an indicator or raise suspicions of sexual abuse, thus triggering an investigation. Also, disapproving parents may force their pregnant teen out of the home, thereby necessitating placement into foster care. A recent descriptive study indicated that nearly one-half of births to girls in foster care were conceived prior to entering foster care (King et al. 2014), which suggests that teen pregnancy is likely to draw the attention of CPS or be an indicator for risk of CPS involvement and foster care placement.

Examining the timing of conception allows for better inferences in this regard. If we observe, for example, that girls who spent time in foster care were at higher risk of early motherhood than low-income or CPS involved girls *before* they entered foster care, this would suggest that differences in early motherhood rates may be driven largely by differential selection. If, instead, we observe that risk of early motherhood was heightened for foster care girls only during their time in foster care, this would suggest a potential causal role of foster care. We also explored the role of specific foster care experiences (placement types, number of placements and episodes in care, length of placement) on risk of early motherhood.

Method

Data

We use the 2015 Wisconsin Multi-Sample Person File (MSPF), housed at the Institute for Research on Poverty at the University of Wisconsin–Madison. The MSPF includes individual-level administrative records from state-administered public systems in Wisconsin, which have been linked across programs and over time. We specifically used records from State-Administered Child Welfare Information System (SACWIS; child welfare system), SNAP (Food Stamps), Temporary Assistance to Needy Families (TANF/cash welfare), Medicaid, child support orders, state prisons, and the Department of Public Instruction. Records across these and other systems were linked using probabilistic matching.

The earliest date at which data were available varied by system. Child welfare records were not completely electronic in all Wisconsin counties until mid-2004; thus, our child welfare sample was constrained to children who were investigated by CPS or entered foster care on or after July 1, 2004 and before their 18th birthdays. Our sample was primarily selected on the basis of child welfare involvement, with a SNAP comparison group. We chose SNAP recipients as a low-income comparison group because SNAP has higher take-up and less-restrictive eligibility criteria than other means-tested programs: approximately 83 % of eligible persons participated in SNAP in 2015, and rates were highest among families with the greatest economic need (U.S. Department of Agriculture 2017). The SNAP group consisted of children listed as a beneficiary on a SNAP case between 2004 and their 18th birthdays; thus, children born later (who are younger in 2004) are observed for a longer period. Exclusions were made for those who died prior to their 18th birthday or were known to have left the state. Of this group, our target sample was females between the ages of 7 and 13 in 2004 ($N = 75,808$). We excluded those who were missing data on early-life

experiences (income and program participation of their birth family) because of an inability to match children to their birth parents ($n = 3,984$).[2] This left 71,824 focal youth (48,915 SNAP but not CPS or foster care; 18,869 CPS but not foster care; and 4,040 foster female youth).

Outcomes

Early motherhood was measured according to the estimated age at conception for first birth, meaning the baby's date of birth minus nine months. Although preterm births occur, we used nine months to determine the approximate date of conception because it is possible that early pregnancy could lead to foster care placement or CPS involvement. Using nine months prior to birth as the date of conception guards against concerns of reverse causality, as detailed later.

Births to focal youth were identified based on contact with a variety of public systems. Births to youth in our sample (youth in families receiving SNAP or involved in the CPS or foster care systems) are generally covered by Medicaid. Medicaid covered 64 % of all births in Wisconsin in 2014 (Kaiser Family Foundation 2018), and coverage rates for births to youth under the age of 18 are expected to be significantly higher.[3] In addition, we had data on births if the mother had interactions with TANF/cash welfare, SNAP, childcare subsidies, child support enforcement, or CPS following the birth. These systems provide additional coverage for any cases not captured in Medicaid records. For example, roughly 95 % of births to females under age 18 in Wisconsin are nonmarital (Wisconsin Department of Health Services 2012), and more than 80 % of all nonmarital births are recorded in the child support enforcement system (Brown and Cook 2008). Thus, although we were able to identify only early births of women who had contact with a public system after the child's birth, very few early births to youth were excluded from our sample. Although we could not ascertain the exact number of unobserved births within our population, we compared the known number of births to women under 20 years of age in Wisconsin by year (as reported by KidsCount Data Center 2017) with the number of births to women under 20 who were known to be residing in the state of Wisconsin in the year of the birth in the MSPF. We found that the count of teen births in the MSPF was between 86 % and 90 % of the official counts, depending on the year.

Explanatory Variables

CPS and foster care data come from the State-Administered Child Welfare Information System (SACWIS). Experience with SNAP and CPS was measured in multiple ways. First, the simple (time-invariant) measure, summarizing experience from 2004 to age 18, was

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[2]The vast majority of girls dropped because of this exclusion were from the SNAP sample (1,868 excluded) and CPS sample (1,951 excluded): only 165 girls were dropped from the foster care sample. The proportion with an early birth was higher in the excluded SNAP group than the included SNAP group (11.3 % vs. 9.1 %), but lower in the excluded CPS and foster care groups (8.5 % and 12.7 %) than the included CPS and foster care groups (17.1 % and 23.2 %). We reestimated our models (with only sociodemographic controls) to include girls who could not be linked to their birth parents; results were substantively similar to those presented here.
[3]For example, recent analysis for 33 states and the District of Columbia (not including Wisconsin) showed a monotonic negative relationship between age and percentage of births covered by Medicaid: 76 % of births to those under 20, 66.4 % for those 20–24, and 41.1 % of those 25–29 in 2010 (Curtin et al. 2013). A Delaware study found Medicaid coverage for 81 % of births to those 17 and younger, 78 % of births to those 18–19, compared with only 36 % of births to those 25–34, were covered by Medicaid (Maiden et al. 2014).

coded as 0 = SNAP only, 1 = CPS without foster care, and 2 = foster care. We then generated a six-category time-variant measure of CPS and foster care experiences. This measure was equal to 0 for all months observed for youth with no known CPS or foster care. Among youth with CPS but no foster care involvement, months were coded as 1 if the observation was prior to CPS involvement and coded as 2 if the observation was during or after CPS involvement. (A month was coded as 2 after a youth's initial CPS involvement, irrespective of subsequent investigated allegations.) Because we could not determine in our data how long a CPS case remained open, and many cases are open for only the period of investigation (typically 30–60 days), we could not clearly differentiate any period of CPS intervention from post-intervention. Last, for those with foster care involvement, months were coded as 3 if prior to foster care entry, 4 if during foster care entry, and 5 if after foster care exit. Youth with multiple entries into foster care were coded as 4 if they were in foster care and 5 after an exit, irrespective of the number of entries or exits.

In supplementary models, we further explored the aspects of foster care that may contribute to risk. We constructed two sets of measures: time-variant measures specific to youth's time in out-of-home care and time-invariant measures that encompass the totality of youths' time in care. The primary time-variant measure was type of out-of-home setting: (1) nonrelative family foster care; (2) kinship care (foster care placement with relatives); (3) congregate care or detention (group home or institution); (4) in a shelter; and (5) AWOL (runaways), other (e.g., hospital), or unknown. Because children often experience more than one placement during a given episode of foster care, and a child may experience multiple episodes of foster care—that is, they may leave foster care to be reunified with their family and then return to foster care—we included time-varying indicators of placement number and episode (entry) number. We also included a time-varying measure of time since the beginning of the current foster care episode (time in care).

To assess risk of early motherhood after exiting foster care, we included summary characteristics of children's time in care. First, we measured the youth's exit type— meaning, to what circumstance the youth left foster care (for those exiting care prior to age 18): reunification (returned to birth parents), adoption or other permanent arrangement (such as guardianship), and other exit (including those who ran away or whose exit types were unknown). Notably, because of our focus on conceptions prior to the youth's 18th birthday, this portion of the analysis was not applicable to youth who aged out of care because they were already 18 years of age when exiting foster care. Other foster care measures were number of placements experienced; total duration spent in care (in months), a binary indicator of multiple removals; percentage of foster care time spent in kinship care; percentage of foster care time spent in congregate or detention settings; and percentage of foster care time spent in temporary/shelter settings (with time in nonrelative family foster care as the reference category). We also included a measure of time since foster care exit.

Controls

Control variables, measured for all youth irrespective of CPS or foster care involvement, included race and ethnicity (non-Hispanic black, non-Hispanic white, Hispanic, American Indian, Asian, multiracial, and unknown); year of birth (to adjust for cohort-specific

differences in birth rates); receipt of Supplemental Security Income (SSI; a proxy for childhood disability); and an indicator for the county responsible for the youth's SNAP, CPS, or foster care involvement. Also included were indicators of early-life (between the ages of 0 and 5) experiences: maternal imprisonment, maternal receipt of cash welfare, maternal receipt of SNAP, average maternal earnings (inflation-adjusted), and average quarters with maternal employment per year. We also included indicators of family size (number of children born to youth's biological mother), complexity (number of fathers of the mother's children), whether the youth was born to unmarried parents, age of mother at time of youth's birth, whether youth's mother was under 19 at her first birth, and a categorical measure of child support context (paternity unknown or not established, paternity established and child support order issued, and paternity established and no child support order issued).

Analytic Approach

Our primary modeling strategy was survival analysis, where the outcome was age at first conception (wherein the conception resulted in a live birth). Our models used the estimated time of conception for first birth as nine months prior to birth. We structured the models so that female youth became at risk of early motherhood at age 13, and observations were censored at age 18, such that all youth were observed for the same duration and at the same ages. Focusing on children conceived when the youth was between the ages of 13 and 18 enables close examination of the timing of conception as it relates to the timing of CPS and foster care involvement.

We evaluated possible distributions for our models and used the Akaike information criterion (AIC) and Bayesian information criterion (BIC) values to identify the Weibull distribution as the best fit. The Weibull distribution assumes a monotonically increasing or decreasing hazard, and the shape of the distribution is expressed by an ancillary parameter, p. In our case, the hazard of early motherhood was very low at age 13 and increased rapidly through the end of the observation period (age 18). Because we modeled the risk of pregnancy resulting in a first birth, in each period, only those girls not already pregnant with a first birth are at risk (and those who have already conceived a first birth are censored). We discuss the implications of this selection process for interpretation of our findings.

We estimated three sets of models. The first included time-invariant indicators of CPS and foster care involvement at any point between 2004 and the youth's 18th birthday, where the reference group was youth who received SNAP between 2004 and their 18th birthdays. Our second set of models focused on the timing of CPS (before vs. during and after youth's first observed CPS investigation) and foster care (before, during, or after placement) compared with the SNAP sample (never observed in CPS or foster care). Both of these sets of models were estimated using three specifications. The initial model included demographic traits. In the subsequent two models, we added economic measures and then family context measures. The third set of models focused on risk factors for early motherhood among foster youth. Specifically, to better understand the associations between foster care and risk of early motherhood, we examined risk factors during and after exiting foster care, including

placement setting and type of exit. This final set of models included all previously discussed control variables in addition to the foster care–specific measures.

Results

Sample Description

In Table 1, we present characteristics for the three subsamples: SNAP, CPS, and foster care. Nine percent of SNAP girls, 17 % of CPS girls, and 23 % of foster care girls gave birth to a child conceived prior to their 18th birthday. There were many significant differences in the characteristics of these groups as well. Although the majority of each group was non-Hispanic white, girls in the CPS sample were more likely than those in the SNAP or foster care samples to be non-Hispanic white, and girls in the foster care group were more likely to be black, American Indian, or multiracial. Girls in both the CPS and foster care groups were less likely than those in the SNAP group to be Asian. The foster care group was more likely to have received SSI, to have received welfare and SNAP between the ages of 0 and 5, and to have mothers with less consistent employment and lower earnings. The CPS and foster care groups were most likely to have mothers whose first birth occurred at age 19 or younger, to have had a child support order, to have been born to unmarried parents, and to have mothers who had children with multiple fathers.

Our sample contains girls who were born between 1991 and 1996. The SNAP and CPS samples had a higher proportion of girls born in the later years of that range because we observed those girls for longer prior to age 18. That is, we observed SNAP and CPS involvement from 2004 until their 18th birthdays, which was 5 years for youth born in 1991 versus 10 years for youth born in 1996. The same differences in period of observation are true of the foster care sample, but a different pattern emerges: wherein more youth were born in the earlier years of our observed range. We cross-referenced this with data from Wisconsin's Adoption and Foster Care Analysis Reporting System (AFCARS) data for the years 2004–2015 to check for potential sample selection abnormalities, and we found that this distribution of birth years is consistent with statewide entry rates among females during that period. The higher proportion of foster care girls in our sample with earlier birth years reflects changing rates of foster care entry for girls in Wisconsin during 2004–2015.

Survival Analysis Results

In Table 2, we present our most basic models examining risk of early motherhood. These models do not consider the timing of CPS or foster care but simply whether the youth ever experienced CPS or foster care at any time between 2004 and turning 18. The coefficients are interpreted as the change in the log hazard of early motherhood corresponding to a one-unit change in a given predictor; the hazard ratios (HRs) are the exponentiated versions of the log hazards and are interpreted as the ratio of rates of early motherhood between the two values of the predictor. Results from these models suggest that girls who experienced CPS and foster care are at significantly higher risk of early motherhood than girls whose families received SNAP but who did not experience CPS involvement or foster care. Although the magnitudes of the associations are attenuated somewhat with the inclusion of economic and family context controls, large disparities remain. Specifically, results from Model 3, which

includes the most extensive set of controls, indicate that the hazard (risk) of early motherhood is twice as high for the CPS group and 2.5 times higher for the foster care group than for the SNAP group.

Although not the focus of our analysis, estimates for the control variables are largely consistent with expectations and previous literature. Early motherhood was more likely for racial and ethnic minority girls and for girls with an early-life (ages 0–5) family history of cash welfare or SNAP participation, and less likely for those whose mothers had greater employment. Early motherhood was also more common among girls with a mother whose first birth occurred at age 19 or younger, who were born to unmarried parents, and whose mothers had more children and children with a greater number of partners.

Table 3 displays results from models that focus on the timing of conceptions resulting in a birth *vis-à-vis* CPS involvement or foster care placement. That is, the models consider whether a birth was conceived before, during, or after a youth's first observed CPS investigation and before, during, or after foster care placement. The results are consistent across the specifications with increasingly extensive controls (Models 1–3). CPS and foster care were associated with greater risk of early motherhood compared with the SNAP group at each time point—before, during, and after CPS investigation or foster care placement. Yet, risk was significantly lower in the CPS group during or after the investigation (HR = 1.9) compared with before (HR = 3.0). Similarly, risk was highest before foster care placement (HR = 3.6), followed by after exiting foster care (HR = 2.7), and was lowest during foster care placement (HR = 1.7).

The results in Table 3 indicate that experiencing foster care is associated with a particularly high risk of early motherhood, but also that this risk is greatest before and after being in care, rather than during care. The results presented in Table 4 further contextualize the association of foster care with early motherhood by estimating the risk of conception leading to birth during placement in a particular type of foster care setting, including nonrelative family foster care, kinship care (relative foster care), congregate care or detention, temporary placement in an emergency shelter, or another situation (such as AWOL or unknown placement) (Model 1), as well as births that were conceived after foster care by the reason for the youth's last observed exit from foster care (Model 2). Because we modeled births before age 18, Model 2 includes only those girls who exited foster care before their 18th birthday and thus excludes girls who aged out of (were emancipated from) care because they did not exit before age 18. We caution that foster care experiences (number and type of placements, and duration) and foster care exit type are nonrandom and are potentially correlated with factors associated with the risk of early births; thus, these estimates should not be interpreted as causal.

The first panel of Table 4 (Model 1) shows that during foster care, girls placed with kin, in temporary (shelter) care, or who were AWOL or in an unknown setting had a higher risk of early motherhood than girls placed in nonrelative family foster care as well as girls in congregate care or detention. Girls who had run away or who were in an unknown setting had the highest risk overall: they were nearly four times more likely to have conceived and birthed a child compared with girls in nonrelative, congregate or detention settings. Duration

in care (time since entry) was not associated with risk, nor was the foster care episode or placement number.

After foster care, girls who exited to adoption or other permanency (e.g., legal guardianship) were significantly less likely to enter early motherhood than were reunified girls. In other words, girls who were reunified with their birth parents (or pre–foster care caregivers) had a higher likelihood of early motherhood than those who exited to another caregiver. This implies that foster care followed by reunification is associated with increased risk of early motherhood for those who exit care, whereas foster care followed by an exit to another permanent arrangement is not. Turning to other characteristics of foster care experiences, time spent in foster care, percentage of time in specific placement setting types, and having multiple foster care episodes were not predictive of early motherhood risk. Number of placements during care, however, was predictive: each additional placement was associated with a 4 % increase in the hazard.

Sensitivity Analyses

As noted earlier, only those girls who did not conceive a birth prior to CPS investigation (or foster care entry) remain at risk of a pregnancy resulting in a first birth in the period after CPS investigation (or foster care entry). To explore the implications of this selection issue, we estimated supplementary models in which we focused on time of birth instead of time of conception. The results for girls in foster care were robust: the risk of a pregnancy resulting in a birth was highest prior to foster care entry and lowest while in foster care. However, the results for CPS investigation were inconsistent with those for our primary models. Specifically, whereas our primary models indicated that risk of conception was higher for girls prior to experiencing CPS involvement, the sensitivity test indicated that risk of giving birth was statistically equivalent pre-and post-CPS involvement. These findings, together, may suggest that pregnancy itself is associated with increased risk of CPS involvement, such that a considerable proportion of girls experienced CPS involvement between conception and giving birth (11 % of all CPS girls who had conceptions leading to first births). In addition, we estimated that 10 % of foster care girls with conceptions leading to first births entered foster care between conception and birth. This may be particularly likely if a pregnancy resulted from sexual abuse. To examine this possibility, we conducted further sensitivity analyses focusing on both conception and birth, excluding from our sample girls who had ever had a CPS allegation related to sexual abuse or sexual exploitation (15 % of all sample girls, 44 % of CPS girls, and 43 % of foster care girls). Consistent with our primary results, we found significantly greater risk of conception prior to CPS involvement than subsequent to it, although the magnitude of the difference was not as large; likewise, these models indicated a smaller magnitude of difference in the risk of conception for girls who conceived prior to CPS involvement relative to girls whose families received SNAP (but who never experienced CPS involvement).

With respect to first birth, we found that the exclusion of sexual abuse allegations produced a similar pattern of findings (lower risk post-CPS than pre-CPS). Overall, although these models suggest that pregnancy may lead to higher risk of CPS involvement for suspected sexual abuse, this does not appear to be the driving factor. Rather, pregnant girls may

become involved with CPS prior to giving birth for reasons other than suspected sexual abuse. We caution, however, that in our analyses, girls who became pregnant with a first birth (or gave birth) prior to becoming involved with CPS were no longer at risk for that outcome subsequent to CPS involvement. In other words, girls who conceived a birth prior to CPS involvement (or foster care placement) may have done so subsequent to such involvement, had they not already done so.

Third, we examined whether changes in mothers' employment or benefit receipt explained differences in pre-CPS versus post-CPS risk. We found no substantive changes in SNAP or TANF participation or in employment during the month preceding a CPS investigation versus the month just after a CPS investigation. We also tested our final model of CPS and foster care as predictors of early motherhood (Table 3) controlling for time-varying SNAP and TANF receipt; the results were substantively similar.

Fourth, some girls in our sample who had CPS or foster care involvement experienced such involvement at an early age (before age 13) and thus were observed only (and only at risk of pregnancy and birth) post-CPS or post–foster care. If those with earlier involvement are systematically different on unobserved characteristics, then this could bias our post-CPS and post-foster care samples. To investigate this possibility, we reestimated our models including only the CPS and foster care girls who entered the risk period (age 13) before their CPS investigation or foster care exit occurred. Both the CPS and foster care results were robust to the sample restriction; patterns remained the same as in our primary models.

Fifth, for our primary models (results shown in Table 3), we estimated specifications in which we allowed both the scale and shape of the hazard to vary across groups, rather than assuming that even though the hazard scale may differ across groups, the hazards change at the same rate over time across groups. We found only modest differences in the pattern of results, with the exception that the hazard rates for the SNAP and post–foster care group increased at faster rates over time than those of all other groups.

In sum, the sensitivity analyses indicated that the foster care findings are largely robust to varying specifications of the models, whereas pre-and post-CPS differences in risk of early motherhood may be attributable to selection. At the same time, we cannot fully rule out that there may be differential selection into pre-and post-CPS involvement conception (or birth) based on factors that were unobserved in our analyses.

Discussion

We estimated the relative risk of early motherhood among girls with low income, girls who experienced CPS investigation (but were not placed in foster care), and girls in foster care. Our findings highlight that girls involved with CPS or experiencing foster care are at substantially higher risk of early motherhood than low-income girls (as approximated by their family receiving SNAP) who did not experience CPS involvement or foster care. Yet, these differences were most evident prior to experiencing CPS involvement or foster care placement—and, in the case of foster care, to a lesser extent after exiting care rather than during care. This indicates that girls involved with CPS and foster care have distinctive risk

profiles that are potentially neither caused nor exacerbated by their contact with the child welfare system. Little evidence exists on the effects of CPS involvement in the absence of foster care placement on outcomes other than child safety, but our findings are consistent with prior work suggesting that foster care is more likely a marker of preexisting disadvantage than a cause *vis-à-vis* subsequent adverse outcomes (Berger et al. 2015; Berzin 2008)—although, some methodologically rigorous research has suggested the contrary (Doyle 2007, 2008).[4]

The disadvantages faced by CPS-involved families include, but extend well beyond, sociodemographic disadvantage, such as low-income and single-parent family structure. Among disadvantaged families, those involved with CPS or whose children who are maltreated are particularly likely to exhibit caregiver depression, have histories of maltreatment in caregivers' own childhoods, live in lower-quality neighborhoods, have caregivers with less than postsecondary education, have a greater number of children and very young children in the home, and experience housing instability (Kotch et al. 1995; Shanahan et al. 2017; Slack et al. 2017). CPS is ill-equipped to address this range of systemic hardships given that its explicit mandate is relatively narrow: to determine whether, and intervene when, maltreatment has occurred. CPS also faces funding, staffing, and structural constraints that prevent more widespread intervention (Child Welfare Information Gateway 2016; Child Welfare League of America 2005), and most families referred to CPS receive no ongoing services (U.S. Department of Health and Human Services 2017). Thus, our finding that early motherhood risk among girls who were CPS-involved (but not in foster care) remained elevated but was lower following the investigation of their alleged victimization than before the investigation is surprising. More work is needed to determine whether CPS involvement itself truly lessens the risk of early motherhood and, if so, by what mechanisms.

Turning to girls who experienced foster care, our results suggest that foster care may mitigate risk of early motherhood. That is, such girls are at lowest risk of experiencing early motherhood during foster care than beforehand and, to a lesser extent, afterward. Future work is needed to identify the mechanisms that explain this association, but we raise a few possibilities. Generally speaking, foster care may provide an environment that discourages early or risky sexual activity. For example, foster homes may provide higher levels of supervision than (maltreating or otherwise at-risk) birth-parent homes, thereby decreasing opportunities to engage in sexual behavior that may lead to pregnancy. Consistent with this explanation, we found that the placements most likely to provide high levels of supervision were associated with a lower risk of conception. Specifically, girls in nonrelative family foster care or other restrictive settings were least likely to conceive during their time in care, whereas girls who had run away were most likely to conceive. It is also possible that foster parents engage in or encourage behaviors that promote delaying motherhood.

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[4]Doyle (2007) found a large local average treatment effect of foster care on greater risk of motherhood before age 20. We found that the risk of early motherhood is lower during care compared with before or after care and that risk is slightly lower after care than before. Results from Doyle's study and ours are not directly comparable; Doyle focused only on a binary measure of foster care and measured the time of birth rather than the time of conception, and therefore could not distinguish births conceived prior to entering foster care from those during or after care. As recent work has shown, many teen births occurring among girls experiencing foster care were conceived prior to entry (King et al. 2014).

Notably, the birth mothers of the girls who were CPS-involved and foster in our sample were disproportionately teen mothers themselves, and consistent with prior studies (De Genna et al. 2011; Meade et al. 2008), we found a significant intergenerational correlation in early motherhood. In addition, other family characteristics—including whether the youth was herself a nonmarital birth and whether her mother bore children from multiple fathers—were associated with higher risk of early motherhood. These intergenerational links may reflect environmental factors (lack of health care and contraceptive access, reduced educational opportunity, and poor neighborhood quality) or parenting behaviors. This is an important focus for future research.

Girls in foster care are likely to experience quite different caregivers and contexts than those they are used to: foster caregivers are more likely to be married and, given licensing requirements, are more likely to live in better neighborhoods and to be more socially and economically advantaged than foster children's birth parents (Dolan et al. 2011, 2012; Fries et al. 2014). Future studies should examine differences in the resources, environments, values, and communication styles of foster and birth parents to better understand the role of these factors. Of particular interest for policy, differences in early motherhood risk between girls experiencing foster care and CPS involvement without foster care may reflect higher levels of psychosocial, health, mental health, and life skills services (preparation for independent living) that are provided to children in care. Additional research on these issues is particularly important for policy. If such services are effective at addressing factors associated with increased sexual risk behavior—such as low educational engagement and attainment, self-esteem, or substance use— then expanding service access to CPS-involved girls who do not experience foster care may be beneficial.

It is also important to note that for some groups, the risk of early motherhood rebounded to near pre–foster care levels after girls exited care, suggesting that time in foster care may not have a sustained protective effect on early motherhood. Interestingly, this appears to be true only for girls who were reunified; girls who were adopted or achieved another form of permanency were one-half as likely as reunified girls to experience early motherhood. This finding may reflect selection in who exits foster care to reunification versus adoption or other permanent placement, but it is also the case that children's environments and resources, as well as the supports and services they receive, are likely to differ across exit types. Current policies provide very little, if any, support to youth who return to their families (Font et al. 2018). This contrasts with the financial and other support often available when youth exit to nonparental homes (adoption and guardianship) as well as the supports and services available to youth aging out of care. This, too, is a topic ripe for further inquiry to guide policy.

This study has notable limitations. First and foremost, CPS and foster care experiences were observed from only 2004 onward; thus, we are not able to capture the full range of CPS and foster care experiences of sample youth, particularly those during the earliest years of life. As such, it is likely that some segment of children in our sample was exposed to CPS or foster care earlier than we were able to observe, and these unobserved experiences have the potential to confound our understanding of timing and between-group differences. Most notably, some proportion of the SNAP sample may have had unidentified CPS or foster care

histories, for which we do not account; likewise, the CPS and foster care samples may well have had earlier CPS and foster care histories that we did not observe. Such contamination of the sample would likely lead us to underestimate differences in risk across groups and to overestimate pre-CPS and pre–foster care risk. We thus encourage future research to replicate our analyses using longer observation periods.

Second, we were able to examine early motherhood among only those females who participated in some form of public assistance or had contact with a system such as cash assistance, Medicaid, child support, or child welfare subsequent to giving birth. Although the vast majority of births to teens—particularly given the high probability that a teen birth will be covered by Medicaid and/or trigger involvement in the child support enforcement system—were included in our data, births may have been underidentified in our analyses. Moreover, because foster youth are automatically eligible for Medicaid, births to girls in foster care may have been identified at a higher rate than teen births generally. Again, this would likely lead us to overestimate risk of early motherhood among foster care girls relative to CPS-involved and other low-income girls.

Third, it is important to consider that increased risk of teen birth is not the same as increased risk of teen pregnancy. Only about 61 % of pregnancies for girls aged 15–19 result in a birth (Kost et al. 2017), and groups may differ in their risk of miscarriage and abortion (as a result of differences in preference or effective choice). Thus, differences in early motherhood should not be construed to reflect differences in sexual activity, risk behavior, or pregnancy, per se.

Finally, although we found that differences in risk of early motherhood predate observed interactions with CPS and foster care, we were not able to identify those factors that may account for elevated risk for this population. A host of risk factors that we could not observe are likely related to family or neighborhood context as well as child behavioral or emotional characteristics that are associated with CPS and foster care as well as risk of early motherhood. Additional research is needed to better identify and understand these factors and the potential for preventative measures.

Conclusion

The results of this study largely indicate that whereas girls who experience CPS and foster care are at increased risk of early motherhood, experiences of CPS involvement and foster care do not appear to increase such risk, but rather—at least in the case of foster care—to reduce it. We base this conclusion on our finding that risk of birth is higher prior to CPS involvement or foster care placement than during or after these experiences. The caregiving contexts that prior research has found to reduce risk of early motherhood include closeness of the parent–child relationship, structure and supervision, and appropriate communication (Miller et al. 2001); interventions that reduce the probability that a girl who is CPS-involved or in foster care will experience future maltreatment as well as interventions that improve the capacity of her parent or caregiver to provide appropriate supervision (substance abuse treatment, mental health services) may also reduce risk of early motherhood in this population, although we were unable to test such mechanisms in this study. Notably, the

reduction in risk of early motherhood during foster care placement did not persist when girls exited foster care to reunification. This suggests that changes in the caregiving environment that occur when girls are in care may be beneficial for reducing early motherhood during their time in foster care. However, among girls at sufficient risk to merit foster care placement, support and services provided to their birth families (either as an antecedent to foster care or preceding family reunification) may not be as effective in mitigating the risk of early motherhood.

Acknowledgments

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Table 1

Sample description: Means (SD) or %

	SNAP (*n* = 48,915)	CPS (*n* = 18,869)	Foster care (*n* = 4,040)
Birth to Child Conceived Before Age 18[a] (%)	9.1	17.1	23.2
Race (%)			
White[b]	52.0	57.0	52.4
Black[a]	25.8	23.7	29.7
Hispanic[c]	10.8	9.3	8.1
Asian[c]	6.8	2.2	1.9
American Indian[a]	2.4	3.0	4.3
Multiracial[a]	1.8	2.3	3.3
Other/unknown[b]	0.5	2.5	0.4
Year of Birth (%)			
1991[a]	13.5	15.3	17.9
1992[e]	15.4	15.9	17.5
1993	16.9	16.5	16.4
1994[d]	17.6	16.9	15.1
1995[f]	18.0	17.1	16.5
1996[e]	18.6	18.2	16.7
Received SSI as Child[a] (%)	3.6	6.8	14.0
Early Economic Experiences (at ages 0–5)			
Welfare receipt[a] (%)	34.3	42.3	49.0
SNAP receipt[a] (%)	52.5	59.7	71.3
Average annual maternal earnings[a]	6,342 (9,364)	7,300 (10,294)	5,242 (8,819)
Average annual maternal quarters employed[a]	1.5 (1.4)	1.8 (1.4)	1.5 (1.3)
Family Context and Mother's Characteristics			
Child born to teen mother[a] (%)	46.3	52.2	57.4
Age of mother at child's birth	24.04	23.26	23.26
Child Support and Paternity			
Child subject of child support order[a] (%)	34.9	25.9	22.3
Paternity established but no child support[c] (%)	12.6	11.1	9.8
No indication of paternity establishment[a] (%)	52.6	63.0	67.9
Number of Children to Mother[d]	3.6 (2.0)	3.5 (2.0)	3.9 (2.2)
Number of Fathers to Mother's Children[a]	1.2 (1.0)	1.5 (1.1)	1.8 (1.1)

	SNAP (*n* = 48,915)	CPS (*n* = 18,869)	Foster care (*n* = 4,040)
Marital Status at Child's Birth (%)			
Marital birth[a]	28.4	30.0	25.4
Nonmarital birth[a]	43.7	50.2	60.7
Unknown[a]	27.9	19.9	13.9
Mother Incarcerated When Child Age 0–5[a]	0.3	0.8	1.9

[a]All groups significantly different at *p* < .01.

[b]CPS distinct from foster care and SNAP at *p* < .01.

[c]SNAP distinct from foster care and CPS at *p* < .01.

[d]Foster care distinct from SNAP and CPS at *p* < .01.

[e]Foster care distinct from SNAP only at *p* < .01.

[f]CPS distinct from SNAP only at *p* < .01.

Table 2

Basic models

	Model 1			Model 2			Model 3		
	b	SE	HR	*b*	SE	HR	*b*	SE	HR
Sample Type (ref. = SNAP)[a]									
CPS	0.75	0.02***	2.13	0.73	0.02***	2.07	0.69	0.02***	2.00
Foster care	1.04	0.04***	2.83	0.98	0.04***	2.68	0.93	0.04***	2.54
Race (ref. = white)									
Black	0.76	0.03***	2.13	0.64	0.03***	1.89	0.50	0.04***	1.64
Hispanic	0.79	0.04***	2.20	0.73	0.04***	2.08	0.66	0.04***	1.93
Asian	0.48	0.06***	1.62	0.38	0.06***	1.47	0.28	0.06***	1.32
American Indian	0.61	0.07***	1.85	0.54	0.07***	1.72	0.46	0.07***	1.58
Multiracial	0.53	0.07***	1.70	0.43	0.07***	1.54	0.35	0.07***	1.42
Other/unknown	−3.01	0.50***	0.05	−2.93	0.50***	0.05	−2.94	0.50***	0.05
Year of Birth (ref. = 1991)									
1992	−0.13	0.03***	0.88	−0.11	0.03***	0.89	−0.12	0.03***	0.88
1993	−0.37	0.04***	0.69	−0.33	0.04***	0.72	−0.35	0.04***	0.71
1994	−0.45	0.04***	0.64	−0.37	0.04***	0.69	−0.40	0.04***	0.67
1995	−0.54	0.04***	0.58	−0.40	0.04***	0.67	−0.45	0.04***	0.64
1996	−0.71	0.04***	0.49	−0.55	0.04***	0.58	−0.61	0.04***	0.54
Received SSI as child	−0.21	0.05***	0.81	−0.26	0.05***	0.77	−0.27	0.05***	0.76
Early Economic Experiences (at ages 0–5)									
Welfare receipt				0.22	0.03***	1.25	0.14	0.03***	1.15
SNAP receipt				0.18	0.03***	1.20	0.08	0.03*	1.09
Average maternal wages				−0.00	0.00	1.00	0.00	0.00	1.00
Average maternal quarters employed				−0.05	0.01***	0.95	−0.06	0.01***	0.95
Family Context and Mother's Characteristics									
Mother under 20 at first birth							0.26	0.03***	1.30
Age of mother at youth's birth							0.00	0.00	1.00
Child support and paternity (ref. = paternity not known to be established)									
Child subject of child support order							−0.05	0.05	0.95
Paternity established but no child support							−0.05	0.04	0.95
Number of children to mother							0.04	0.01***	1.05
Number of fathers to mother's children							0.03	0.01**	1.03
Marital status at child's birth (ref. = Marital birth)									
Nonmarital birth							0.13	0.03***	1.14

	Model 1			Model 2			Model 3		
	b	SE	HR	*b*	SE	HR	*b*	SE	HR
Unknown							−0.09	0.05	0.92
Mother incarcerated at child age 0–5							−0.18	0.12	0.84
Constant	−12.16	0.21 ***		−12.32	0.21 ***		−12.52	0.22 ***	
Ln(*p*)	0.92	0.01 ***		0.92	0.01 ***		0.92	0.01 ***	

Notes: Log hazard coefficients and standard errors. HR = hazard ratio. *N* = 4,160,558 person-months; 8,528 births. Models include county fixed effects.

[a]CPS different from foster care at *p* < .001 in all models.

[*]*p* < .05

[**]*p* < .01

[***]*p* < .001

Table 3

Timing of CPS and foster care as predictors of early motherhood

	b	SE	HR
Model 1. Demographic Controls			
Group status (ref. = SNAP)			
CPS; before observed involvement[b,c,d]	1.12	0.04***	3.07
CPS; on or after involvement[a,c,e]	0.68	0.03***	1.98
Foster care; before observed entry[a,b,d,e]	1.37	0.07***	3.94
Foster care; during an episode[a,c,e]	0.62	0.07***	1.87
Foster care; after exiting[b,c,d]	1.11	0.05***	3.03
Model 2. Add Early Economic Exposures Group status (ref. = SNAP)			
CPS; before observed involvement[b,c,d]	1.11	0.04***	3.03
CPS; on or after involvement[a,c,e]	0.65	0.03***	1.92
Foster care; before observed entry[a,b,d,e]	1.33	0.07***	3.79
Foster care; during an episode[a,c,e]	0.56	0.07***	1.75
Foster care; after exiting[b,c,d]	1.05	0.05***	2.86
Model 3. Add Family Context and Mother's Characteristics Group status (ref. = SNAP)			
CPS; before observed involvement[b,c,d]	1.08	0.04***	2.96
CPS; on or after involvement[a,c,e]	0.62	0.03***	1.85
Foster care; before observed entry[a,b,d,e]	1.29	0.07***	3.63
Foster care; during an episode[a,c,e]	0.50	0.07***	1.66
Foster care; after exiting[b,c,d]	1.00	0.05***	2.72

Notes: Log hazard coefficients and standard errors. HR = hazard ratio. N = 4,160,558 person-months; 8,528 births. Models include county fixed effects and all covariates shown in Table 2.

[a] before CPS at $p < .01$.

[b] after CPS at $p < .01$.

[c] before foster care at $p < .01$.

[d] during foster care at $p < .01$.

[e] After foster care at $p < .01$.

*** $p < .001$

Table 4

Risk for early motherhood during and after foster care

	b	SE	HR
Model 1. During Foster Care (*n* = 57,443 person-months; 191 births)			
Setting (ref. = nonrelative family foster care)			
Kin	0.68	0.20***	1.98
Congregate or detention	0.03	0.22	0.97
Temporary	0.83	0.27**	2.30
Other setting	1.29	0.27***	3.63
Time since entry to care (ref. = 0–6 months)			
7–24 months	−0.05	0.19	0.95
>24 months	−0.04	0.23	0.96
Episode number	0.11	0.08	1.11
Placement number	0.03	0.02	1.03
Model 2. After Foster Care (*n* = 77,273 person-months; 477 births)			
Type of exit (ref. = reunification)			
Adoption or other permanency	−0.65	0.18***	0.52
Other exit	0.11	0.17	1.11
Time since exiting (ref. = 0–6 months)			
7–24 months	0.04	0.12	1.04
>24 months	−0.26	0.15	0.77
% Foster care time with kin	−0.10	0.15	0.90
% Foster care time in congregate or detention	0.26	0.15	1.30
% Foster care time in temporary care	0.40	0.17*	1.49
Total number of placements	0.04	0.01**	1.04
Multiple episodes	0.03	0.12	1.03
Total months spent in care	−0.01	0.01	0.99

Notes: HR = hazard ratio. Models include all controls shown in Table 1 plus county fixed effects. Other setting includes placements that were unknown, as well as placements in rare settings such as hospitals. Other exit includes those who ran away or whose exit type was unknown.

*
$p < .05$

**
$p < .01$

***
$p < .001$