Children's Elevated Risk of Asthma in Unmarried Families: Underlying Structural and Behavioral Mechanisms

Center for Research on Child Wellbeing
Working Paper #2005-01-FF

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Key Words: Single-Parent, Child Health, Asthma, Family Structure

Word Count: 8183 (including all but tables)

Number of Tables and Figures: 4

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Children's Elevated Risk of Asthma in Unmarried Families:

Abstract: Among a recent birth cohort in U.S. cities, children were far more likely to be diagnosed with asthma and to experience an asthma-related emergency within 15 months of their birth if their parents were unmarried. Comparing babies born to parents who were married, cohabiting, and not living together at the time of their baby's birth reveals a "family structure gradient:" asthma diagnoses and emergencies increase in a linear fashion as the parents' relationship becomes weaker. This paper uses longitudinal data from the Fragile Families and Child Wellbeing Study to provide evidence on the mechanisms underlying the relationship between family structure and children's asthma. I find that demographic and socioeconomic correlates of marriage explain asthma differences between children of married and cohabiting parents. However, children whose parents live apart appear to be at heightened risk of being diagnosed with asthma and experiencing an asthma-related emergency even after taking into account demographic and socioeconomic characteristics. Mother's health behavior explains a relatively small portion of family structure differences in asthma, and father involvement makes no difference in children's asthma diagnosis or emergencies.

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I. Introduction

The general finding that children raised by two biological parents are better off than their counterparts raised in single-parent families has been replicated across various ages during childhood and across a wide range of domains of wellbeing (McLanahan and Sandefur 1994; Angel and Worobey 1988; Cherlin et al. 1991). The robust relationship between marriage and child wellbeing has led policymakers and academics to declare an end to the debate over *whether* marriage is best setting for raising children and to turn their attention to the question of *how* government can promote marriage through policies and programs (Horn 2001; Institute for American Values 2002). Yet, in spite of the proclaimed consensus about the benefits of marriage, important questions remain about the mechanisms through which marriage is associated with benefits for children. Is marriage beneficial because children do better when parents live together? Does marriage only appear to be beneficial because it acts as a proxy for higher socioeconomic status? Or, does the institution of marriage increase parents' sense of commitment to their families and the investments they make in their children? The answers to these questions are important, because they suggest dramatically different causal models and policy responses.

In this paper, I examine the underlying mechanisms that drive the relationship between family structure and child wellbeing using the case of family structure disparities in asthma diagnosis and asthma-related emergencies among very young children. Family

structure disparities in pediatric asthma are stark. Among the recent birth cohort that I analyze in this paper, children with unmarried parents have twice the odds of being diagnosed with asthma and three times the odds of experiencing an asthma-related emergency in the first 15 months of their life relative to their counterparts in married-parent families. Prior research has also documented the higher prevalence of asthma among children in single-parent families but has not attempted to examine the mechanisms that drive this relationship (Dey, Schiller, and Tai 2004; Dawson 1991; Newacheck 2000). Yet, the interpretation of these disparities as well as policy responses very much depend on the mechanisms that underlie the relationship between family structure and asthma. In this paper, I examine the relative importance of three possible mechanisms: coresidence, demographic and socioeconomic correlates of family structure, and parenting behaviors. I also analyze the association between parental relationship trajectories and children's asthma outcomes.

I analyze longitudinal data from the Fragile Families and Child Wellbeing study, which follows a birth cohort born in 20 U.S. cities between 1998 and 2000. More than 13 percent of children in the study had been diagnosed with asthma by around the time of their first birthday and nearly 10 percent had received emergency treatment for asthma. The Fragile Families study provides detailed survey data on parents' resources, behaviors, parenting practices, and their relationship status, which I use to explore the sources of family structure differences in children's asthma.

Pediatric asthma is a good test case for a number of reasons. Asthma is strongly correlated with socioeconomic status, and asthma is an illness that is highly sensitive to parental management. Parents who have the time, resources, and knowledge to closely

monitor children, respond to warning signs, and avoid exposing their children to triggers have a better chance of preventing asthma from getting serious and of avoiding the need for emergency treatment (Heymann 2000; Clark 1998; Conboy 1989). Further, because many asthma triggers are found in indoor settings (dust mites, pet dander, cockroaches), parental coresidence may shield children from exposure to asthma triggers by limiting the number of households children spend time in. Lastly, asthma is an important case to consider because it is the most prevalent chronic illness among children, and prevalence and severity have been on the rise among very young children (Akinbami and Schoendorf 2002; Marielena et al. 2001).

II. Theory and Prior Research

The relationship between family structure and child health has been well-documented in prior research (Angel and Worobey 1988, Lundberg 1993; Mauldon 1990). And, more specifically, prior research using data from the National Health Interview Survey has revealed a correlation between single-parent families and children's rates of asthma diagnosis and disabling asthma (Dey, Schiller, and Tai 2004; Dawson 1991; Newacheck 2000). Although these studies did not explore the mechanisms through which single parent families are associated with asthma, combining research on the correlates of asthma with research on growing up with a single parent suggests several possible mechanisms.

Parental Coresidence. Children whose parents live in separate residences may be at heightened risk of developing asthma or having an asthma-related emergency, because they are more likely to move back and forth between mother and father's household and

to spend time being cared for outside of the home. Because many asthma triggers are found inside the household, children who spend time in multiple indoor settings have multiple opportunities for exposure to known triggers such as pet dander, dust mites, and cockroaches. In contrast, children with parents who coreside are likely to spend less time outside of the parents' home; and, therefore, to be exposed to fewer settings with potential asthma triggers. Children whose parents live together may also benefit from more parental time, supervision, and caretaking compared with their counterparts living with a single mother. And, children whose parents live together may experience less stress and more stability in their household arrangements.

Married parents typically live under one roof, but a growing share of families are headed by two unmarried, cohabiting parents. If marriage is good for children because it brings two biological parents together under one roof, then we can expect cohabitation to be associated with similar benefits for children. Although intuitively it would seem that parental cohabitation would be equivalent to marriage from the perspective of a young child, prior research has found that children with cohabiting parents resemble children in single-parent families in terms of their child outcomes (Brown 2004; Manning and Lamb 2003). Other research suggests that, even if children born to cohabiting parents were as well off, children with cohabiting parents experience more family instability compared to their counterparts with married parents and are placed at a disadvantage because of the stress and disruption associated with these transitions (Manning, Smock, and Majumdar 2004). Prior research has not settled the question of whether children living with married and cohabiting parents with experience similar outcomes when both family stability and socioeconomic status are similar.

Marriage makes for Better Parents. Theoretically, marriage may be a better setting for children than cohabitation if the institution of marriage fosters stronger parental commitment to their families and causes parents to invest more and take better care of their joint investment in a child. Research provides some support for the idea that married parents engage in parenting practices that are most beneficial for children. Aronson and Huston (2004) find that married parents exhibit better parenting practices compared with their unmarried counterparts. A body of research examining the link between marriage and child wellbeing generally finds that parental behavior, supervision, and social capital explain some, though a relatively small portion, of family structure differences in child wellbeing (McLanahan and Sandefur 1994; Hanson, McLanahan, and Thomson 1997; Thomson, Hanson, and McLanahan 1994; Astone and McLanahan 1991).

There are reasons to suspect that parental behavior may be linked to children's risk of asthma diagnosis. The most clear-cut example is breastfeeding. Breastfeeding has a protective effect on children and has been correlated with lower rates of asthma (Gdalevich, Mimouni, and Mimouni 2001). Other maternal health behaviors such as smoking, drinking, and mother's own health may also be linked to children's risk of being diagnosed with asthma. If marriage fosters greater commitment and investment in children, then married parents may engage in behaviors that are healthier for children and reduce the risk of asthma diagnosis.

Among children who are diagnosed with asthma, parenting time, attention, and caregiving have a potentially large role to play in managing the asthma (Clark 1998; Conboy 1989). Increasingly the management of children's chronic illness has shifted

from medical to family caregiving placing ever more importance and pressure on parents to perform health-management tasks (Hill 1995). With children's asthma in particular, preventive strategies among children diagnosed have been found to have a large impact on child wellbeing (Marielena et al. 2001). Therefore, parental behavior among children diagnosed with asthma is likely to be particularly important for the wellbeing of these children.

Family Structure as Proxy. Family structure may be associated with better asthma outcomes simply because it proxies for demographic characteristics and socioeconomic status. Many researchers have documented wide socioeconomic disparities between married and unmarried families (Bianchi 1999; Sigle-Rushton 2002; Thomas and Sawhill 2002). Separate research has found that demographic and socioeconomic characteristics are strongly correlated with asthma diagnosis and morbidity (Akinbami and Schoendorf 2002, Marielena et al. 2001; Dey, Schiller, and Tai 2004; Dawson 1991; Newacheck 2000). In particular, rates of asthma are higher for African-Americans and Hispanics and for children living in poverty.

Sociologists have proposed the socioeconomic status is a fundamental cause of health and longevity (Mechanic 2000; Link and Phelan 1995). Given that family structure is highly correlated with socioeconomic status, the fundamental cause literature is relevant for any consideration of family structure and health. The theory of socioeconomic status as a fundamental cause proposes that those with socioeconomic advantages will be able to access whatever it takes to maximize their health outcomes. Going one step further, it is reasonable to expect that those with socioeconomic advantages will also be able to harness their socioeconomic advantages for the benefit of

their children. Therefore, we can expect socioeconomic status to explain at least a portion of family structure disparities in children's asthma.

Relationship Transitions and Child Health. Parents' relationship status often changes over time, and relationship transitions, especially divorce, are strongly associated with child outcomes (Cherlin et al. 1991). Parents' relationship transitions are likely to be associated with children's health and asthma outcomes. The stress of relationship dissolution may have direct negative effects on children's health and wellbeing. Relationship transitions may also affect children's health via its effects on parents. Relationship transitions are likely to be stressful for parents and to divert parental time and attention from children. For children with asthma, these effects on parents' time and supervision may have serious consequences in terms of the quality of asthma management. Parents' undergoing relationship transitions may be less vigilant about controlling children's exposure to asthma triggers or less responsive to warning signs at the onset of an asthma attack.

Prior research suggests that children's health may be a cause as well as an effect of parents' relationship transitions. In particular, parental divorce has been shown to cause a wide range of negative effects on children's wellbeing (Cherlin et al. 1991; Mauldon 1990), and children's ill health has been shown to destabilize parental relationships (Mauldon 1992; Reichman, Corman, and Noonan 2004). Parents whose children have asthma or have severe asthma may experience relationship stress as a result and an elevated risk of relationship dissolution. For this reason, after a child is born, family structure may be endogenous with respect to the child's health. Hao and Xie

(2002) provide an excellent discussion of the endogeneity of family structure in relation to children's misbehavior.

Following from prior research, the analysis in this paper addresses the following hypotheses:

(1) Parental coresidence is associated with better asthma outcomes for children because of the reduced exposure and greater amount of parental supervision when parents coreside. Children with married and cohabiting parents will resemble one another in asthma outcomes once demographic and socioeconomic differences are held constant.

(2) Having married parents is associated with lower rates of asthma diagnosis and asthma emergencies in part because of demographic and socioeconomic characteristics that are correlated with both family structure and asthma.

(3) Having married parents is associated with lower rates of asthma diagnosis and asthma emergencies in part because of differences in parental behavior and involvement across family structure. Specifically, I explore whether married mothers engage in healthier behaviors than unmarried mothers, which help to explain differences in their children's asthma. I also explore whether children are better off in terms of their asthma outcomes when their fathers are more involved in parenting.

(4) Relationship transitions will have a negative effect on children's asthma outcomes. Dissolution of marriage or cohabiting relationships will be associated with heightened risk of asthma and asthma emergencies for children. Parents' stable coresidence will be associated with the lowest rates of asthma diagnosis and emergencies.

III. Data and Methods

The data for this paper come from the Fragile Families and Child Wellbeing study. Fragile Families is a longitudinal study that follows a birth cohort of approximately 3,700 children born to unmarried parents and 1,200 children born to married parents. The sample is designed to be representative of births to unmarried parents in cities with populations of 200,000 or more. Baseline interviews with mothers were completed in the hospital shortly after the birth. Fathers were also interviewed soon after the birth, either at the hospital or as soon as possible thereafter. This paper utilizes data from the baseline survey and from the "one-year" follow-up survey, which was administered when babies were about 15 months old on average. Family structure and most of the control variables and independent variables are measured in the mother's baseline survey. The dependent variables, as well as a few of the independent variables, were measured at the one-year follow-up interview.

Family structure at birth. Parents were classified into three groups based on mothers' report of her relationship with the baby's father at the time of the birth: married, cohabiting, or living apart. The living apart category consists of parents who were either romantically involved, just friends, hardly ever saw each other, or in which the father was unknown to the mother.[1]

[1] In separate analyses, I distinguished parents living apart and romantically involved from those living apart and not romantically involved. There were no statistically or practically significant differences between these groups in terms of the analysis undertaken in this paper.

Some parents underwent changes in their relationship status between birth and the follow-up. Because of the relatively short follow-up period of 15 months on average, most parents remained in the same relationship status at follow-up. Transitions were especially uncommon for parents who were married when their children were born. Only 6 percent of parents married at birth were not married at follow-up. Cohabitating relationships were more likely to be dissolved between birth and follow-up. About 30 percent of parents who were cohabiting at baseline were no longer living together at follow-up. Of parents who were living apart at follow-up, 23 percent moved in together by the time of the follow-up interview.

Most of the analysis focuses on parents' relationship at birth because this is largely exogenous with respect to children's health. Relationship transitions between birth and follow-up may be both the cause and the effect of children's health. The Fragile Families data do not allow me to sort out the causal ordering of asthma and family structure transitions. Other research using the Fragile Families data found that children's health has a substantial destabilizing effect on parental relationships (Reichman, Corman, and Noonan 2004). Because relationship transitions may affect child health, the analysis presents results on the association between transitions and asthma.

Dependent variables. I examine two child health outcomes: whether the child was diagnosed with asthma by a doctor or medical professional and whether the child ever received emergency treatment for asthma. These outcomes are based on mother

responses to the follow-up interview in 18 cities. Asthma questions were not asked in the first 2 cities in which the follow-up survey was administered.

The dependent variables in this analysis rely on mother's self-reports of their child's asthma based on the following questions:

1) Has a doctor or other health professional ever told you that (CHILD) has asthma?

2) If YES, mothers were then asked: Since (CHILD) was born, did (CHILD) have to visit an emergency room or urgent care center because of asthma?

Table 1 shows that each of these outcomes varied by family structure at birth. Children with married parents have the lowest rates of asthma and asthma-related emergencies, children whose parents were unmarried and living apart have the highest rates, and children whose parents were cohabiting were in between. The rates of asthma diagnosis are extremely high for children of such a young age. National prevalence estimates are in the range of 12 percent for children age 0 to 18 years (Dey, Schiller, and Tai 2004). The rates of asthma diagnosis are strikingly high given the very young age of children in the Fragile Families study, but are consistent with research showing that asthma rates are correlated with urban residence, poverty, and are higher for African-Americans and Hispanics (Dey, Schiller, and Tai 2004, Akinbami and Schoendorf 2002, Marielena et al. 2001). The Fragile Families sample is entirely urban and disproportionately poor, African-American, and Hispanic.

Control variables. Table 1 shows that children were on average 15 months old at the time of the follow-up interview. Older children have had more time to be diagnosed with asthma, so I control for child's age (in months) in all models. Prior research has found that boys are at higher risk of asthma, so I also control for child's gender (Dey, Schiller,

and Tai 2004). Lastly, I control for city of residence in all models, since asthma rates vary considerably across cities and asthma hospitalization rates have been shown to vary by region (Homa, Mannino, Redd 2002). Controlling for city of residence eliminates the effect of regional variation in diagnosis patterns.

Explanatory Variables. Based on the hypothesized explanations for family structure differences in children's asthma, I examine three sets of potential underlying mechanisms. First, I look at a set of structural variables that encompass demographic, socioeconomic, and health insurance variables. Second, I analyze mother's health and health behaviors. Third, I consider whether father involvement is an intervening mechanism. I expect that all three sets of variables are correlated with family structure and with asthma.

The variables that I refer to as "structural" variables were measured in the baseline survey at the time babies were born and include demographic, socioeconomic and health insurance characteristics. Demographic characteristics include mother's race, number of children in the household, and whether the mother gave birth as a teenager. Socioeconomic characteristics include mother's education, whether the mother is a homeowner, and logged household income. Along with the demographic and socioeconomic characteristics, I also include a variable indicating that the baby's birth was covered by private health insurance.[2]

[2] About 95 percent of births were covered by private insurance or Medicaid. The other 5 percent of births were covered by another government insurance program, charity care, were paid for out of pocket, or covered by an unspecified "other" insurance program.

As expected, Table 1 shows stark differences between married and unmarried parents in terms of structural characteristics. The married group consists of a much larger proportion of white parents and a much lower proportion of black parents compared with the cohabiting or living apart groups. Many fewer married parents gave birth as teenagers, and married parents have fewer children on average compared with unmarried parents. Married parents have more education, much higher incomes, are more likely to be homeowners, and are more likely to have private insurance compared with unmarried parents.

Although the biggest socioeconomic disparity was between married and unmarried parents, there were also some significant differences between unmarried parents who were cohabiting and unmarried parents who were living apart. When the two groups of unmarried parents differed, unmarried parents who lived apart tended to be worse off. Unmarried parents living apart had lower incomes and were more likely to be teen parents compared with unmarried cohabiting parents. On the other hand, unmarried parents living apart were more likely to own their home than cohabiting parents were. In general, the differences between groups of unmarried parents were dwarfed by the differences between married and unmarried parents.

To test this maternal health and health behavior hypothesis, I examine the following characteristics: mother drank during pregnancy, mother smokes cigarettes, mother in fair or poor health, mother depressed at the follow-up, and mother breastfed the child. Drinking, smoking, and mother's health were based on mother responses to the baseline survey. Depression and breastfeeding were based on mother responses to the

one-year follow-up survey. The Fragile Families data do not include direct measures of the ways in which mothers or fathers manage asthma among children who are diagnosed.

Table 1 shows that unmarried mothers tended to be less healthy and engaged in more unhealthy behaviors compared with married mothers. Unmarried mothers were more likely to smoke, report poor health, and to be depressed compared with married mothers. Unmarried mothers were less likely to breastfeed their child, which is pertinent because prior research has found that breastfeeding protects against asthma (Gdalevich, Mimouni, and Mimouni 2001). Unmarried mothers living apart from the father were more likely to drink during pregnancy and less likely to breastfeed compared to mothers who were cohabiting with the father, but these two groups of unmarried mothers were similar in their other health and health-related characteristics.

Father involvement was measured using two scales, one capturing the extent of father involvement and the other measuring mothers' assessments of the quality of the father's involvement. The "father tasks" scale combines mothers' responses to the six items below, and ranges from 0 to 6. For each answer of "7 days" to the first two questions or "often" to the third through sixth questions, the scale was incremented by 1.

For each activity, please tell me how many days a week (FATHER) does this in a typical week.

1. Change (CHILD's) diaper

2. Feed or give a bottle to (CHILD)

Please tell me how often (FATHER) helps you with the following:

3. How often does he look after (CHILD) when you need to do things?

4. How often does he run errands for you like picking things up from the store?

5. How often does he fix things around your home, paint, or help make it look nicer in other ways?

6. How often does he take (CHILD) places (he/she) needs to go, such as to daycare or the doctor?

The father quality scale combines answers to the six items below and also ranges from 0 to 6. For each item to which mothers answered "always true" the scale was incremented by 1.

1. When (FATHER) is with (CHILD), he acts like the father you want for your child
2. You can trust (FATHER) to take good care of (CHILD)
3. He respects the schedules and rules you make for (CHILD)
4. He supports you in the way you want to raise (CHILD)
5. You and (FATHER) talk about problems that come up with raising (CHILD)
6. You can count on (FATHER) for help when you need someone to look after (CHILD) for a few hours

Table 1 shows that married fathers were the most involved and received the most positive assessments from mothers. Unmarried fathers living apart were the least involved and were rated the lowest by mothers. Unmarried cohabiting fathers fell in between.

Other potential explanations. I tested several additional hypotheses that might mediate family structure effects on child health, but which proved to be unimportant. Child care arrangements, mothers' work schedules, living with other adults (such as grandparents), and residential mobility did not contribute to family structure effects and were mostly not related to child health either. Children's low birth weight is related to their risk of asthma but was not included in models because of potential endogeneity of low birth weight with respect to family structure.

Another potential explanation, that unmarried parents substitute emergency care for primary care, was not supported by the data. Differences in health-care utilization did

not appear to contribute to family structure disparities in asthma diagnosis or emergencies. Married parents did utilize routine health care more frequently than unmarried parents, but differences were fairly small and utilization was high for all family structures: 96 percent of married parents had 4 or more check ups compared with about 92 percent of unmarried parents. However, routine health care utilization was not correlated with asthma diagnosis (93 percent of diagnosed and not diagnosed had 4 or more health care exams) or emergencies (93-94 percent of emergency, no emergency groups had 4 or more health care exams). Plus, controlling for number of doctor visits does not alter the relationship between family structure and asthma emergencies.

Other potential explanations that could not be tested because data were not available include neighborhood characteristics, quality of housing stock, and air quality. Previous research has found that quality of housing stock and air quality are correlated with asthma (Institute of Medicine 2000).

Analytic approach. Equations 1 and 2 illustrate my analytic approach for estimating family structure effects on child health and for testing explanations for the family structure effects. I begin by estimating the following logistic regression model:

$$(1) \qquad \mathrm{Ln}(\Pi_i/1-\Pi_i) = \alpha + \beta_1 C_i + \beta_2 A_i + \boldsymbol{\delta}\mathbf{X_i}$$

where Π is the expected value of the probability of a dichotomous child health outcome (asthma diagnosis or emergency treatment for asthma) at the one-year follow-up point; *C* indicates that the parents were cohabiting; *A* indicates the parents were unmarried and living apart; and **X** is a vector of control variables (baby's gender, age at the time of the one-year follow-up interview, and city of residence). β_1 and β_2 when exponentiated

represent the odds of the health outcome for cohabiting or unmarried parents living apart relative to married parents, respectively.

I compare estimates of the family structure effects on child health (β_1 and β_2) from equation 1 to estimates from equation 2, which includes an additional set of explanatory variables:

$$(2) \qquad \text{Ln}(\Pi_i/1\text{-}\Pi_i) = \alpha + \beta_1 C_i + \beta_2 A_i + \boldsymbol{\delta X_i} + \boldsymbol{\eta E}$$

where **E** is a vector of explanatory variables—either demographic and socioeconomic, maternal health and health-related behaviors, or father involvement. If the explanatory variables mediate the relationship between family structure and child asthma, then controlling for the explanatory variables will reduce the estimated differences in child asthma across family structures (i.e., β_1 and β_2).

The analysis also includes an examination of parents' relationship transitions between birth and follow-up and children's asthma emergencies. The analysis of relationship transitions follows a similar logistic regression approach, modeling the log odds of asthma emergencies, but includes dummy variables for five different relationship trajectories on the right hand side, with stable marriage as the reference group. I analyze parents who were cohabiting at birth and follow-up, living apart at birth and follow-up, dissolved a marriage between birth and follow-up, dissolved a cohabitation between birth and follow-up, and parents who moved in together between birth and follow-up to see if these different relationship trajectories are associated with children's odds of an asthma-related emergency.

IV. Results

Table 2 shows estimates of the relationship between family structure and asthma diagnosis. In particular, the odds of asthma diagnosis for children whose parents were unmarried and cohabiting or unmarried and living apart are compared with the odds of asthma diagnosis for children whose parents were married.

Children with married parents have the lowest odds of asthma diagnosis, children whose parents are living apart have the highest odds, and children whose parents are cohabiting occupy an intermediate position. In the simplest model, controlling only for child's gender, age, and city of residence, the odds of asthma diagnosis for unmarried cohabiting parents are 1.74 times the odds for married parents, and the odds for unmarried parents living apart are 2.61 times those of married parents.

Table 1 showed that married and unmarried parents differ significantly in their demographic, socioeconomic, and health insurance characteristics. Table 2 demonstrates that after taking into account these demographic, socioeconomic, and insurance differences, the odds of diagnosis for married and cohabiting parents do not differ significantly. The results suggest that unmarried cohabitation is equivalent to marriage in terms of the risk of asthma diagnosis at a very young age once differences in demographic and socioeconomic characteristics and health insurance are taken into account. Therefore, differences in diagnosis between married and cohabiting families seem to have much more to do with race, class, and health care access than with family structure per se. For unmarried parents living apart, taking into account demographic and socioeconomic characteristics and health insurance in Model 2 substantially reduces the odds of diagnosis from 2.6 to 1.5 relative to married parents. Therefore, demographic,

socioeconomic, and insurance characteristics explain a great deal but not all of the disparity between married and single-mother family structures.

Model 2 also reveals which background characteristics are related to asthma diagnosis among the young children in the study. Consistent with prior research, race and socioeconomic disadvantage were associated with asthma diagnosis. Children who were black or Hispanic had twice the odds of asthma diagnosis compared with white children. Children whose mothers had a high school education or beyond were less likely to be diagnosed with asthma. Owning a home and having private health insurance were associated with a lower risk of asthma diagnosis. Having other children in the household was related to a heightened the risk of asthma diagnosis. All of these asthma correlates are consistent with prior research findings (Dey, Schiller, and Tai 2004, Akinbami and Schoendorf 2002, Marielena et al. 2001).

Because demographic, socioeconomic, and health insurance variables are highly correlated with one another, the model which combines all of these predictors may conceal some relationships between individual predictors and asthma. In separate analyses, I examined one-by-one the effects of demographic characteristics, socioeconomic characteristics, and health insurance on family structure differences in asthma. When these sets of variables were analyzed separately, each on its own explained between 36 and 58 percent of differences between married and cohabiting or married and living apart families. The most important mechanisms mediating the relationship between family structure and asthma were parents' race, education, income, and private insurance.

Model 3 examines the effects of maternal health and health-related behaviors on the odds of asthma diagnosis. Hypothetically, children with unmarried parents may be less healthy because their mothers are less healthy. However, Model 3 finds that maternal health and health behaviors explain a fairly small portion of the relationship between family structure and asthma diagnosis. Nevertheless, children whose mothers are in poor health were more likely to be diagnosed with asthma. The relationship between mother and child's health is consistent with a hereditary component of poor health or with environmental influences that affect mother and child health simultaneously. Children who were breastfed were less likely to be diagnosed with asthma, which is consistent with prior research, and children with married parents were much more likely to be breastfed. Taking into account differences across family structures in mother's health and breastfeeding and other maternal health behavior explains about 25 percent of the difference in asthma diagnosis across family structures.

Finally, Model 4 considers whether the extent of father involvement and mothers' satisfaction with father's support and parenting help to explain the relationship between family structure and asthma diagnosis. Father quality is (weakly) associated with a reduction in the odds of asthma diagnosis, and taking into account the amount and quality of father involvement slightly reduces the odds of asthma diagnosis for unmarried parents living apart relative to married parents. These results are consistent with the theory that children whose parents live apart are slightly better off when their fathers remain involved in childrearing and when mothers view fathers' parenting positively. However, father involvement has only a small effect on family structure differences in asthma.

Notably, the direction of causality between father quality and involvement and child health is unclear. Father involvement may improve child health. Alternatively, poor child health may reduce father involvement, for instance if fathering becomes more burdensome in the face of a chronic illness. A similar argument can be made for maternal depression. Mother's depression may lead to worse health outcomes for children, or a child's poor health may cause maternal depression. Aside from these exceptions, other independent variables were measured at baseline (rather than at the one-year follow-up point), meaning that reverse causality is not an issue.

Table 3 turns to the second child outcome measure: having received emergency treatment for asthma. Taking into account only the control variables in Model 1, the family structure disparities in emergency treatment for asthma are much larger than the disparities in asthma diagnosis. The wider disparity in emergency treatment than in diagnosis may reflect that unmarried parents have a more difficult time managing their children's asthma or that asthma tends to be more severe among children with unmarried parents compared with their counterparts in married families. The odds of emergency treatment for asthma for children whose parents were unmarried and cohabiting were 2.2 times that of married parents. The odds of emergency treatment for children whose parents lived apart were 3.3 times that of married parents.

The explanations for why family structure is related to emergency treatment for asthma are consistent with the explanations for family structure disparities in asthma diagnosis. The evidence supports the hypothesis that a large part of the married-parent advantage stems from married parents' demographic, socioeconomic, and insurance characteristics. After taking into account these characteristics, the odds of emergency

treatment for asthma become much more similar across the family structures. The relative odds of emergency treatment are reduced from 2.2 to 1.2 for cohabiting parents and from 3.3 to 1.7 for unmarried parents living apart compared with married parents in Model 2.

Model 2 shows that demographic, socioeconomic, and insurance correlates of asthma emergencies were consistent with prior research and with the correlates of asthma diagnosis. All children who received emergency treatment for asthma had also been diagnosed with asthma; therefore, it is not surprising that correlates of these two outcomes are similar. Race (non-white), number of children in the household, low maternal education, and Medicaid were associated with asthma emergencies.

Separate analyses showed that health insurance played a large role in explaining differences in emergency treatment across family structures. Children with private insurance were much less likely to receive emergency treatment for asthma compared with children on Medicaid. Multiple interpretations are consistent with this finding. Private insurance may provide better quality and access to primary and preventive care than Medicaid, making emergency room visits less likely. Children on Medicaid may be sicker, and may require more emergency treatment even with the same quality and access to primary care. The data suggest the latter, because children on Medicaid and primary insurance had similar patterns of usage of primary and preventive care (not shown).

Table 3 shows that maternal health and health-related behaviors account for a relatively small portion of family structure differences in asthma emergencies compared with demographic characteristics, socioeconomic status, and health insurance. Mother's health and healthy behaviors account for approximately 15 percent of the difference

across family structures in asthma emergencies. As in Table 2, Table 3 finds a relationship between mother and child health. Children whose mothers are in fair or poor health are more likely to experience an asthma emergency.

Model 4 shows that the amount and quality of father involvement do not help to explain family structure disparities in asthma emergencies. The lack of impact of father involvement on asthma emergencies is potentially revealing. One interpretation is that father involvement does not improve children's health. Another possibility is that children's ill health decreases father involvement. Generally, the results suggest two conclusions. First, to the extent that parental behavior influences children's health, mother's health and healthy behaviors are far more influential than the extent of father involvement. Second, mother and father behavior is easily trumped by demographic, socioeconomic, and health insurance in explaining family structure disparities.

In separate analyses (not shown), I examined the relationship between family structure and asthma-related emergencies after conditioning the sample on asthma diagnosis. Restricting the sample to children who had been diagnosed with asthma greatly reduces the sample size, but offers the advantage of disentangling family structure disparities in the severity and management of child asthma from disparities in diagnosis. This analysis shows that the odds of an asthma emergency among children who had been diagnosed with asthma were 1.8 times greater for children with unmarried parents compared with children whose parents were married. Taking into account demographic, socioeconomic, and health insurance characteristics reduces the relative odds of asthma emergencies for children with unmarried/married parents to insignificance. Most

maternal health and behaviors and father involvement variables were not related to asthma emergencies after conditioning on diagnosis.

Table 4 analyzes the association between relationship transitions (that occurred between birth and follow-up) and asthma emergencies. Children's odds of asthma emergencies in stable marriages are compared with the odds in five other possible relationship trajectories: stable cohabitation (parents were cohabiting at birth and follow-up), stable living apart (parents were living apart at birth and follow-up), dissolved marriage (parents were married at birth but not at follow-up), dissolved cohabitation (parents were living together at birth but not at follow-up), and moved in together (parents were living apart at baseline but living together at follow-up).

Table 4 reveals some interesting relationships between parents' relationship trajectories and children's odds of an asthma emergency. Perhaps most noteworthy is the strong relationship between marital dissolution and children's asthma emergencies. Model 1 shows that marital disruption between birth and follow-up is associated with a 6-fold increase the odds of an asthma emergency relative to children whose parents were stably married between birth and follow-up. After taking into account the full set of control variables in Model 5, marital disruption is associated with a 5-fold increase in the odds of an asthma-related emergency relative to stably married parents. Among all combinations of parental relationship at birth and follow-up, the relative odds of an asthma emergency were highest for children whose parents ended a marriage after the child was born. With the available data, it is not possible to determine whether marriages that ended caused more asthma emergencies, or whether asthma emergencies caused or accelerated marital dissolution. However, it is noteworthy that, unlike marital

dissolutions, cohabitating relationships that dissolved were not associated with a particularly high risk of asthma emergency.

Table 4 also shows that stable cohabitation was not significantly different from stable marriage in terms of odds of an asthma emergency after taking into account differences in demographic and socioeconomic characteristics (Models 2 and 5). The results suggest that, at least in the case of asthma emergencies, stable cohabitation is similar to stable marriage. The results also show that marital dissolution is much more strongly associated with asthma emergencies than dissolution of a cohabitating relationship is. The dissolution finding could indicate that children's ill health has a stronger destabilizing effect on marriage than on cohabitation. Alternatively, marital disruption may have stronger negative effects on children's health than the disruption of a cohabiting relationship does.

Among children whose parents lived apart when they were born, the odds of asthma emergencies is similar whether their parents subsequently moved in together or not. Therefore, parents' moving in together did not appear to help or hinder the management of children's asthma at least in the short-term; and children's asthma does not seem to act as a deterrent to the formation of cohabiting unions.

V. Discussion

This paper examined reasons for the relationship between family structure and children's asthma early in the life course. I found that young children with married parents were less likely to be diagnosed with asthma and less likely to experience an asthma-related emergency than their counterparts whose parents were unmarried, but that

a large portion of this disparity stems from the socioeconomic and demographic correlates of marriage. Married parents have higher incomes and more education, which are likely to be correlated with better quality homes and better neighborhoods. The socioeconomic advantages associated with marriage appear to provide protection against asthma diagnosis and asthma emergencies.

Under similar socioeconomic conditions, children whose parents are unmarried and cohabiting have rates of asthma diagnosis and emergencies that are similar to children with married parents. However, children whose parents were unmarried and living apart appear to be at higher risk of being diagnosed with asthma and of requiring emergency treatment for asthma even after taking into account background characteristics. While I cannot completely rule out the effect of unobserved characteristics (e.g., housing stock or air quality), the results are consistent with the theory that the presence of two parents in the household has a protective effect on child health.

Parental health, behavior, and involvement play a relatively small role in explaining family structure disparities in children's asthma. The small role that parents plays in explaining family structure disparities in children's asthma is largely via maternal health behavior. Although family structure is strongly linked to children's asthma, which implies that the proximity of fathers matters, the extent of father involvement is not related to children's asthma and does not explain family structure disparities. Children whose parents live apart seem to be at a disadvantage which is not mitigated by the involvement of noncustodial fathers. Given the large role that parents play in managing their children's asthma, it is somewhat surprising that maternal health

behavior and father involvement were not more strongly associated with asthma-related emergencies. On the other hand, direct measures of what mothers and fathers did to manage their children's health were not available, and the importance of parents in managing children's asthma is not contradicted by my findings.

To return to the questions posed at the beginning of the paper, in the case of asthma among very young children, the benefits of marriage seem to stem from the benefits of parental coresidence and the demographic and socioeconomic correlates of marriage. The parenting behaviors measured in this study have relatively little to do with family structure differences in asthma.

Using the longitudinal data from the study, I was able to analyze the association between parents' relationship stability or instability and children's asthma emergencies. The analysis of transitions provides further evidence that children with married and cohabiting parents are similar in their asthma outcomes once background characteristics are taken into account and when both relationships are stable over time. However, marriage and cohabitation are not equivalent when it comes to relationship dissolution. Marital disruption is very strongly related to asthma emergencies, which may suggest that children's asthma has a strong destabilizing effect on parents' marriage or that marital disruption has a strong negative influence on the management of children's asthma. The disruption of a cohabiting relationship was not as strongly related to asthma emergencies.

While much of the difference in children's asthma across family structures can be "explained" by underlying mechanisms such as coresidence and demographic and socioeconomic characteristics, these family structure disparities nevertheless have potential ramifications for children's future wellbeing. Early life disadvantages

associated with family structure (whether or not they operate via socioeconomic correlates of family structure) are likely to accumulate over the life course. Children with asthma are likely to face restrictions on their activities, missed school days, and other health and social disadvantages. Researchers have shown that negative effects of being born low birth weight persist over the life course (Conley and Bennett 2000). Similarly, the early family structure differences in asthma examined in this paper may be one cause of family structures disparities in children's health and wellbeing later in life.

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Table 1. Means of Dependent and Independent Variables by Family Structure at Birth

	Parents' relationship at time of birth:			
	Married	Unmarried cohabiting	Unmarried living apart	
Child health at age 1				
Asthma diagnosis (%)	7.6	12.4 **	18.2 **	xx
Asthma emergency treatment (%)	3.5	7.1 **	11.1 **	xx
Controls				
Baby's age at follow-up interview (months)	14.9	14.8	15.5 **	xx
Baby is a boy (%)	51.7	50.3	53.5	
Demographic and socioeconomic characteristics				
Mother is white (%)	45.5	20.4 **	11.0 **	xx
Mother is black (%)	27.3	46.4 **	69.1 **	xx
Mother is Hispanic (%)	19.8	30.6 **	17.8	xx
Mother is not white, black, or Hispanic (%)	7.5	2.6 **	2.2 **	
Mother was less than 20 at birth (%)	3.2	18.5 **	27.0 **	xx
Number of other children in household	1.1	1.2	1.4 **	xx
Mother did not finish high school (%)	14.9	43.3 **	44.7 **	
Mother high school graduate (%)	17.9	29.0 **	29.2 **	
Mother has education beyond high school (%)	67.2	27.7 **	26.2 **	
Household income ($)	43614	18334 **	13238 **	xx
Owns home (%)	54.0	25.1 **	34.8 **	xx
Birth covered by private health insurance (%)	73.2	24.0 **	18.9 **	xx
Maternal health and health behavior				
Mother drank during pregnancy (%)	10.0	8.2	11.2	xx
Mother smokes (%)	7.7	22.5 **	23.5 **	
Mother fair or poor health (%)	3.7	7.8 **	8.7 **	
Mother depressed at follow-up (%)	15.9	20.6 **	22.3 **	
Mother breastfed child (%)	75.0	52.5 **	43.7 **	xx
Father involvement				
Father tasks scale (0-6)[a]	3.6	3.2 **	1.7 **	xx
Father quality scale (0-6)[b]	4.9	4.5 **	3.1 **	xx
N	924	1336	1487	

Source: Fragile Families and Child Wellbeing Study

Notes: Statistically significant differences compared with the married group are indicated by ** p<.01 * p<.05 Significant differences between the cohabiting and living apart groups are indicated by xx p<.01 x p<.05.

[a] "Father tasks" scale counts 1 for each of the following 6 items: Father changes diapers 7 days a week, feeds child 7 days a week, watches child often, runs errands often, fixes the house often, and provides transportation often.

[b] "Father quality" scale counts 1 for each of the following 6 items: Father is always the father the mother wants for her child, mother always trusts father, father always respects mother's rules and schedule, always supports mother, always talks with mother about raising child, and mother can always count on father.

Table 2. Predictors of Children's Asthma Diagnosis by Age 1

	Model 1 Control	Model 2 Structural	Model 3 Mother	Model 4 Father	Model 5 Full
Unmarried cohabiting	1.74 **	1.07	1.61 **	1.71 **	1.04
	(3.66)	(0.41)	(3.08)	(3.52)	(0.25)
Unmarried living apart	2.61 **	1.48 *	2.36 **	2.40 **	1.33
	(6.72)	(2.31)	(5.83)	(5.78)	(1.62)
Child's age (months)	1.03	1.02	1.03	1.03	1.02
	(1.60)	(1.15)	(1.45)	(1.48)	(0.92)
Child is a boy	1.84 **	1.90 **	1.85 **	1.85 **	1.91 **
	(6.04)	(6.27)	(6.04)	(6.07)	(6.29)
Black		2.15 **			2.12 **
		(4.21)			(4.06)
Hispanic		1.94 **			1.92 **
		(3.10)			(3.00)
Not black, Hispanic, or white		1.64			1.60
		(1.44)			(1.36)
Teen mother		0.95			0.96
		(0.44)			(0.30)
Number of other children		1.15 **			1.15 **
		(3.94)			(3.88)
Mother high school graduate		0.81 ^			0.82
		(1.73)			(1.62)
Mother has some college		0.74 *			0.76 ^
		(2.20)			(1.92)
Logged household income		0.99			1.00
		(0.15)			(0.02)
Owns home		0.79 *			0.80 ^
		(2.00)			(1.94)
Private health insurance		0.70 *			0.71 *
		(2.55)			(2.46)
Mother drank during pregnancy			1.04		1.03
			(0.25)		(0.19)
Mother smokes			1.01		0.96
			(0.08)		(0.28)
Mother fair or poor health			1.80 **		1.59 **
			(3.63)		(2.82)
Mother depressed at follow-up			0.98		0.91
			(0.16)		(0.77)
Mother breastfed child			0.80 *		0.90
			(2.16)		(1.02)
Father tasks scale				1.00	1.00
				0.00	(0.07)
Father quality scale				0.95	0.95 ^
				(1.60)	(1.80)
N=3747					

Source: Fragile Families and Child Wellbeing Study

Notes: Odds ratios appear in table and t-statistics are in parentheses. All models controls for baby's gender, baby's age at the time of the follow-up interview, and city of residence. Model 2 controls for demographic, socioeconomic, and health insurance characteristics. Model 3 controls for maternal health and health behaviors. Model 4 controls for father involvment. Model 5 includes the full set of covariates.

Table 3. Predictors of Child Receiving Emergency Treatment for Asthma by Age 1

	Model 1: Controls	Model 2: Structural	Model 3: Mother	Model 4: Father	Model 5: Full
Unmarried cohabiting	2.19 **	1.22	2.00 **	2.18 **	1.20
	(3.71)	(0.84)	(3.23)	(3.69)	(0.80)
Unmarried living apart	3.30 **	1.65 *	2.97 **	3.27 **	1.61 *
	(5.98)	(2.18)	(5.31)	(5.66)	(1.99)
Child's age (months)	1.05 ^	1.04	1.04 ^	1.05 ^	1.04
	(1.89)	(1.53)	(1.73)	(1.89)	(1.41)
Child is a boy	1.94 **	2.02 **	1.94 **	1.94 **	2.02 **
	(5.07)	(5.32)	(5.07)	(5.08)	(5.27)
Black		2.91 **			2.82 **
		(3.99)			(3.83)
Hispanic		2.37 **			2.31 **
		(2.80)			(2.68)
Not black, Hispanic, or white		2.51 *			2.38 ^
		(2.05)			(1.91)
Teen mother		1.01			1.02
		(0.06)			(0.09)
Number of other children		1.17 **			1.17 **
		(3.65)			(3.64)
Mother high school graduate		0.73 ^			0.74 ^
		(1.96)			(1.89)
Mother has some college		0.81			0.84
		(1.21)			(0.96)
Logged household income		1.07			1.07
		(1.06)			(1.13)
Owns home		0.74 *			0.74 ^
		(1.98)			(1.93)
Private health insurance		0.51 **			0.51 **
		(3.57)			(3.50)
Mother drank during pregnancy			0.76		0.74
			(1.19)		(1.28)
Mother smokes			1.11		1.05
			(0.65)		(0.26)
Mother fair or poor health			1.89 **		1.70 **
			(3.26)		(2.67)
Mother depressed at follow-up			0.98		0.92
			(0.16)		(0.53)
Mother breastfed child			0.82		0.93
			(1.49)		(0.55)
Father tasks scale				1.03	1.03
				(0.66)	(0.67)
Father quality scale				0.97	0.96
				(0.91)	(1.11)
N=3747					

Source: Fragile Families and Child Wellbeing Study

Notes: Odds ratios appear in table and t-statistics are in parentheses. All models controls for baby's gender, baby's age at the time of the follow-up interview, and city of residence. Model 2 controls for demographic, socioeconomic, and health insurance characteristics. Model 3 controls for maternal health and health behaviors. Model 4 controls for father involvment. Model 5

Table 4. Parental Relationship Transitions and Asthma Emergencies

	Model 1: Controls		Model 2: Structural		Model 3: Mother		Model 4: Father		Model 5: Full	
Asthma emergencies										
Stable marriage (reference)	1.00		1.00		1.00		1.00		1.00	
Stable cohabitation	2.60	**	1.51		2.40	**	2.57	**	1.48	
	(3.85)		(1.54)		(3.50)		(3.81)		(1.47)	
Stable living apart	4.28	**	2.15	**	3.89	**	4.64	**	2.20	**
	(6.35)		(2.96)		(5.79)		(6.10)		(2.80)	
Dissolved marriage	6.12	**	4.84	**	5.64	**	6.44	**	4.68	**
	(4.03)		(3.46)		(3.81)		(4.06)		(3.31)	
Dissolved cohabitation	3.14	**	1.64	^	2.84	**	3.36	**	1.68	^
	(4.12)		(1.66)		(3.70)		(4.20)		(1.67)	
Moved in together	4.04	**	2.04	*	3.63	**	4.01	**	1.99	*
	(5.08)		(2.38)		(4.61)		(5.05)		(2.30)	
N=3725										

Source: Fragile Families and Child Wellbeing Study

Notes: Odds ratios appear in table and T-statistics are in parentheses. All models controls for baby's gender, baby's age at the time of the follow-up interview, and city of residence. Model 2 controls for demographic, socioeconomic, and health insurance characteristics. Model 3 controls for maternal health and health behaviors. Model 4 controls for father involvment. Model 5 includes the full set of covariates.

** p<0.01; * p<0.05; ^ p<0.10 (two tailed).