

FAMILY STRUCTURE AND CHILD HEALTH OUTCOMES IN FRAGILE FAMILIES

May 2008

Sharon Bzostek, Princeton University
Audrey Beck, Princeton University

DRAFT: PLEASE DO NOT CITE WITHOUT PERMISSION FROM THE AUTHORS

ABSTRACT

Dramatic changes in family demography in the United States have led to increasing numbers of children living in “non-traditional” households. A large body of literature documents the association between living in a non-traditional family structure/familial instability and children’s cognitive and behavioral outcomes. In contrast, relatively little research has focused on the relationship between family structure and instability and children’s physical health outcomes, despite the fact that there is good theoretical reason to expect that family structure and instability might be associated with children’s physical health.

The current study uses data from the Fragile Families and Child Wellbeing Study to assess whether family structure and familial instability are associated with a variety of children’s physical health outcomes. The paper pays particular attention to possible mediating mechanisms and utilizes longitudinal data to address potential problems of selection bias and reverse causality. The results suggest that children living with two married biological parents tend to fare better than children living in less traditional family structures across a variety of physical health outcomes, and that at least some portion of these relationships are likely the result of selection bias and/or reverse causality.

FAMILY STRUCTURE AND CHILD HEALTH OUTCOMES IN FRAGILE FAMILIES

In recent decades, dramatic changes in marriage, cohabitation, and childbearing in the United States have led to increasing numbers of children living in “non-traditional” households that do not include two married, biological parent families. A large and ever-growing body of literature has tried to document and explain associations between living in a non-traditional family structure and familial instability and the well-being of both parents and children in such families. In particular, a good deal of research has been devoted to studying children’s cognitive, educational, behavioral (including teenage childbearing), and emotional/mental health outcomes. Little recent research, however, has focused on the relationship between family structure and instability and children’s physical health. This is surprising given that there is good theoretical reason to expect that living in certain types of family situations and experiencing family instability would be associated with adverse health outcomes for children. For example, the dissolution of a parental union could lead to loss of health insurance coverage and geographic mobility, both of which could be linked to children receiving less-good or less regular health care. This might be especially problematic if children have already been diagnosed with a health problem requiring regular maintenance and care. Loss of income and additional stress caused by family instability could also lead to less beneficial health-related behaviors among parents—children might, for example, watch more television, engage in fewer physical activities, and eat less healthy foods. The stress associated with family instability or hardship could also translate directly into worse health outcomes for children if they express emotional anxiety and distress through physical symptoms.

Adverse health outcomes during childhood have both immediate and longer-term implications for children. A recent literature review by Wood et al. (2007) notes that children

who grow up in two-parent families tend to live longer and have better adult health outcomes than do children raised in single- or divorced-parent families. As these researchers note, however, it remains unclear whether the majority of this effect operates indirectly through childhood family structure's effect on children's future socioeconomic status and health-related behaviors, or more directly through the effect of childhood family structure on childhood health status, which is known to be related to adult health and socioeconomic outcomes (Case, Fertig & Paxson, 2005). In addition to having potentially important implications for well-being in adulthood, illnesses and injuries occurring during childhood may also interfere with important developmental stages, perhaps preventing children from doing important things (e.g., attending school regularly) that they might otherwise be able to do.

The current study takes advantage of longitudinal data from a cohort of young children living in mostly non-traditional family structures to examine the association between family structure and instability and early childhood physical health, asking not only whether family structure and instability are associated with adverse child health outcomes, but also to what extent such associations might be the result of selection bias and reverse causality. These analyses represent a step forward in our understanding of the relationship between family structure and related processes and child health outcomes for a growing number of children living in nontraditional family settings.

PREVIOUS RESEARCH

The majority of the relatively small existing body of literature about family structure and children's health has found significant associations between the two. As would be expected given findings from research about the relationship between family structure and children's

cognitive and behavioral outcomes, living with two biological parents is usually found to be associated with better physical health outcomes for children. For example, compared with children living with two biological parents, children living with single mothers have significantly worse overall reports of physical and dental health, higher rates of asthma and respiratory allergies, more missed days of school and more frequent headaches, as well as worse mental and behavioral health outcomes (Angel & Worobey, 1988; Bramlett & Blumberg, 2007; Dawson, 1991). This research generally finds that although adjustment for sociodemographic differences reduces the size of such disparities, significant differences between children in single mother and those in two parent families remain. Factors such as maternal depression, familial stress, lower levels of income and other resources, and lower levels of parental supervision have all been suggested by previous research as potential mechanisms through which family structure may have negative consequences for childhood health outcomes. For the most part, however, these mechanisms have been the subject of discussion sections rather than a focus of analysis; it is thus still unclear to what extent such mechanisms can explain these seemingly-consistent associations.

In addition to the association between family structure and childhood health, previous research finds that familial disruption may also be related to children's health outcomes. Studies have found that children who have experienced a parental divorce have higher rates of accidents, injuries and poisoning than children living in undisrupted, two-biological parent families (Bloom & Dawson, 1991; Dawson, 1991). This has important implications for child wellbeing at the population level, given that these factors are leading causes of childhood mortality and morbidity (Dawson, 1991). Interestingly, these authors do not find an elevated risk of accidents for children living with never-married mothers; the increased risk is limited to children in disrupted families.

This may indicate that it is the processes associated with familial disruption, rather than the lack of parental supervision in single-parent households, that are related to higher rates of accidents and injuries among children in disrupted families (Dawson, 1991). At least one previous study finds that the process of parental separation is also associated with higher rates of childhood illness, relative to children living in undisrupted two-parent families (Mauldon, 1990).

Overall, then, previous research suggests that both family structure and familial instability are associated with children's health outcomes. In particular, most research suggests that children living in undisrupted, two-biological parent families fare better across a number of outcomes than do those living in single mother families or in families disrupted by divorce (including, in some cases, those in which the mother has repartnered). Sociodemographic differences across family structure seem to account for some, but not all, of these differences.

While this body of research provides important information about the health of children living in various family situations, these studies suffer from a few crucial limitations. Most of this research has only examined the association between family structure and child health outcomes cross-sectionally. As a result, very few of these studies have been able to address the possibility that any associations are due to selection rather than a causal relationship between family structure and child health. One study (Mauldon, 1990) that does address the issue of selection bias (by looking at pre- and post-divorce rates of childhood illness) concludes that the associations identified between disruption and childhood illness are not due to selection.

Additionally, poor child health may be a *cause* as well as a consequence of parental union dissolution. This possibility is borne out by research by Reichman et al. suggesting that poor health among 12-18 month olds is significantly associated with a lower probability of the biological parents coresiding, and a higher probability of the parents transitioning into a less

involved relationship (Reichman, Corman & Noonan, 2004). Cross-sectional studies cannot address the possibility that child health may cause as well as reflect family structure and instability. The few longitudinal studies that have been able to address the potential problems of reverse-causality and selection have mostly used older data, which are unable to adequately capture increasingly important variations in family structure (distinguishing between married and cohabiting families, for example). Although the Reichman et al. paper was based on a recent cohort of children born to mostly unmarried parents, their analyses focused on relatively severe childhood health problems occurring early-on in the child's life. It is unclear whether their findings would extend to health problems that develop later-on (and are perhaps less severe in nature) in the young child's life.

The present study builds and improves upon previous research in this area by examining the association between family structure and instability and childhood health outcomes for a recent cohort of 5-year old children born to mostly unwed parents. In addition to documenting cross-sectional associations between family structure/instability and child health, we consider the role of potential mediating mechanisms in explaining these associations, and utilize longitudinal measures of child health to address the potential problems of selection bias and reverse causality described above. Several substantive groups of variables are included as potential mechanisms through which family structure and instability may affect child health outcomes, including income/material hardship and access to health care, health care utilization, maternal involvement with the child and mental health, health-related behaviors, and geographic mobility.

DATA AND METHODS

Data for this study are drawn from the Fragile Families and Child Wellbeing Study, a longitudinal study of nearly 5,000 children born between 1998 and 2000 from birth through age

five. Parents were interviewed at the time of the child's birth and again approximately one, three and five years later. In addition to the "core" telephone interviews at each wave, "In-Home" supplemental interviews were conducted in-person with a subset of mothers and their children three and five years after the birth. (For more information about the study design, see Reichman, Teitler, Garfinkel, & McLanahan, 2001.) Information for the present analysis is taken from mothers' reports in the baseline survey and the three- and five-year core and in-home follow-up surveys. Regression-based multiple imputation methods (using the "proc mi" command in SAS) are used to impute values for all missing independent variables. Respondents missing on a particular dependent variable are dropped from the analysis of that outcome, but may be included in the analytic sample for other outcomes. The sample size varies across outcomes both because some questions were only asked of certain mothers (i.e., those who participated in the In-Home supplemental survey) and because of differential response rates to various questions.

Measures

Outcome variables

The paper utilizes five measures of child physical health status: whether the child is overweight or obese, whether the child has ever been diagnosed by a health professional as having asthma, the mother's overall assessment of the child's health (possible ratings are *poor*, *fair*, *good*, *very good*, and *excellent*), whether the child was hospitalized overnight in the past year, and whether the child had any accidents or injuries requiring medical attention in the past year. The primary analyses are based on measures of these outcomes when the focal child was approximately five years old. Supplemental analyses also use comparable measures of the same

five child health outcomes from around the time of the child's third birthday to address issues of potential selection bias and reverse causality.

With the exception of the child being overweight/obese, all of the outcomes are mother-reported. Overweight/obese is defined, in accordance with the National Center for Health Statistics guidelines, as the child's Body-Mass Index (BMI) being at or above the 95th percentile for the child's age and sex. The child's BMI is determined using physical measurements of the child's height and weight obtained by the interviewer during the in-home survey. Maternal ratings of child health and reports of asthma diagnosis at five years are obtained through the core interview; all other outcomes (including reports of asthma diagnosis at three years) are obtained during the in-home supplemental surveys. Because very few mothers reported that their young children were in poor health, the response categories "fair" and "poor" were combined, resulting in a four-category measure of overall child health status.

Predictor variables

Family structure and instability

Current family structure is defined using maternal reports regarding whether she is currently: married to the child's biological father, married to a new partner (called a "social father"), cohabiting with the biological father, cohabiting with a social father, or not living with a romantic partner. Relationship instability is defined as the total number of residential and nonresidential relationship transitions the mother reports experiencing since the child's birth.¹

¹ Mothers were not asked in the one- or three-year interviews about the number of non-residential partnership changes they experienced since the previous interview. Following the strategy used by Osborne & McLanahan (2007), mothers who report a pregnancy with a new partner between the two interviews are coded as having entered and exited a partnership if they were not in a relationship with this partner at the time of the interview. Because we are unable to count nonresidential partnerships changes that are not a result of a pregnancy, we are likely undercounting partnership changes between the baseline

Transitions from cohabitation to marriage with the same partner are not included as a relationship transition.

Basic sociodemographic controls

Our basic regression models control for a series of sociodemographic variables that are likely to be associated with both family structure and child health outcomes. These variables are all mother-reported at the time of the child's birth, and include mother's age, educational attainment (defined as less than high school/GED, high school diploma, and some college or more), race/ethnicity (defined as white and other non-Hispanic, black non-Hispanic and Hispanic), and nativity status, the child's sex, whether the child was born at a low or very low birthweight, and whether the focal child was the mother's first birth.

Potential mediators

In addition to controlling for basic sociodemographic characteristics, some of the models presented in Table 3 also control for substantive groups of variables that may mediate the relationship between family structure/instability and child health. These groups of variables include: measures of material hardship (including an indicator variable for the family's income being below 100% of the federal poverty threshold, whether the family had experienced food insecurity in the previous year, and whether the child had public, private or no health insurance coverage), a measure of the number of residential moves the mother and child have made in the previous year; measures of health care utilization (whether the child had at least one well-child

and three-year interviews. At the five-year interview, nonresidential transitions are based on mother reports of the number of romantic, nonresidential partnerships lasting at least one month since the previous interview. Results from preliminary analyses using the number of residential transitions mothers reported since the time of the child's birth were not substantively different from those presented here.

check-up in the past year and whether the child has a regular source of health care²); measures of maternal well-being and activities (whether the mother exhibited symptoms of major depression as measured by an abbreviated CIDI questionnaire, the average number of days per week the mother reports participating in a number of child-oriented activities with the child); and several measures of health-related behaviors (including the number of fast food meals the child eats in an average week, the number of hours the child spends watching TV on an average weekend day, and the number of hours the child spends playing outdoors on an average weekend day.)

Analytic strategy

The analysis proceeds in two stages. We begin by using the data cross-sectionally to consider the association between family structure and a history of familial instability and child health outcomes at one point in time. Doing this allows us to compare our results with those of most of the previous literature in this area. After describing the analytic sample in Table 1, in Table 2 we present bivariate associations between family structure and child health at age 5. Table 3 presents results from a series of nested logistic and ordered logistic regressions predicting the five child health outcomes. Model 1 for each outcome includes just the basic sociodemographic controls. Model 2 then adds in a control for the mother's reported relationship instability since the time of the child's birth, and Model 3 adds in the potential mediating variables.

Second, we take advantage of the longitudinal data available from the Fragile Families study to assess the extent to which the associations identified between family structure and child health outcomes are likely due to selection bias and/or reverse causality. Table 4 presents results

² Note that regular source of care cannot be included as a potential mediator for the models predicting overnight hospitalization because of insufficient variation in the outcome variable.

from fixed effect regression models assessing the extent to which specific changes in family structure between the three- and five-year interviews are associated with changes in child health outcomes over the same period. We look specifically at changes in child health outcomes among children who transition between three and five years into living with both parents, children who transition into living with their mothers and a social father, and children who transition into living with a single mother.

By accounting for all time-invariant characteristics of the child (and the child's family), fixed effect analyses provide some information about the extent to which the associations identified between family structure and child health may be due to an unmeasured (but unchanging) factor that makes certain children more likely both to be in particular family structures and to experience poor health outcomes. If the association between a change in family structure and the child's health outcome remains significant, this is seen as evidence that selection bias does not explain all of the association between family structure and child health. Theoretically, we would expect that changes in family structure would cause changes in child health outcomes. Because the fixed effect analyses presented here examine changes in both of these factors over the same time period (between the three and five-year interviews), however, it is impossible to determine with certainty the direction of causality of any associations we might identify.

Finally, in Table 5 we again use longitudinal data to test the hypothesis that the cross-sectional associations identified between family structure and child health may be the result of reverse causality. This table presents results from models testing whether child health status at age 3 predicts whether children who are living with both biological parents at three years still

live with both biological parents at 5 years. This analysis extends the Reichman et al. (2004) analysis described previously to an older group of children.

RESULTS

Analysis 1: Documenting associations between family structure/instability and child health

Table 1 provides a basic description of the primary sample used for analysis, and Table 2 presents bivariate associations between family structure and child health outcomes at 5 years. Without controlling for any other factors, children living with two married biological parents exhibit significantly lower levels of asthma, have significantly better overall health, and are less likely to have been hospitalized in the previous year than their counterparts living in less traditional family structures. They are also more likely than those living with single mothers in particular to be overweight or obese and to have had an accident or injury requiring medical attention in the previous year. Among children living in other types of family situations, those living with social fathers appear to have somewhat worse health (in terms of asthma, overall health status and overnight hospitalizations) than those in other groups, though the differences are not always statistically significant.

Table 3 presents odds ratios from nested logistic and ordered logistic regression models predicting the five measures of child health at age 5. The first model for each outcome includes only the basic sociodemographic controls, the second model adds in a control for the mother's reported relationship instability since the child's birth, and the last model includes controls for a series of potential mediating factors. The results from the first model with only basic sociodemographic controls suggest that although the association between current family structure and child health varies by the outcome under consideration, when there are statistically

significant differences identified between children living with two married biological parents (the reference category) and other groups, the differences consistently favor the children living with married biological parents.³ Children whose mothers are not living with partners experience at least marginally worse health than children living with two married biological parents for all five outcomes. Relative to children living with two married biological parents, those living with cohabiting biological parents and those living with their mothers and their mothers' new married or cohabiting partners have at least marginally higher odds of having been diagnosed with asthma and having poorer overall health. There are no statistically significant differences between children living with married versus cohabiting social fathers for any of the five outcomes.

Compared with children living with their mothers and no partners, children living with social fathers (married or cohabiting) have significantly lower odds of having had an accident or injury requiring medical attention in the previous year. Children living with cohabiting social fathers, however, have significantly higher odds of having been diagnosed with asthma than do children living with just their mothers. Children living with cohabiting biological parents have significantly lower odds than children living with just their mothers of having been hospitalized overnight in the previous year.

With the exception of overnight hospitalizations, adding a control for the mother's history of relationship instability since the child's birth does not substantially change the associations identified between current family structure and child health outcomes. The number of relationship transitions the mother experienced in the previous five years is not significantly associated with four out of the five measures of child health, suggesting that current family

³ Results (not shown here) from regression models predicting child health status at 5 years based on baseline family structure also find significant differences between children living with married biological parents and other groups.

structure is a much stronger predictor of child health status than is a history of familial instability for these four outcomes.

In contrast with the other outcomes, the odds of the child having been hospitalized overnight in the past year are significantly and negatively associated with the total number of partnership changes that the mother reports. This finding runs counter to theoretical expectations that a higher number of relationship transitions might be associated with greater stress and instability, which could lead to less parental oversight and supervision, perhaps resulting in unchecked illnesses or accidents requiring hospitalization. The negative association identified may be because mothers with sick children (those who are most likely to experience overnight hospitalization) may have less time and energy available to pursue new relationships than other mothers.

The final set of models in Table 3 examines the association between family structure and instability and child health net of a number of potential mediating mechanisms, or processes through which family structure could influence child health outcomes. These factors include poverty and material hardship, health care access and utilization, maternal involvement and mental health, diet and activity behaviors, and geographic mobility. In several cases, the strength of the relationship between family structure and child health outcomes is attenuated by the addition of these controls, suggesting that these factors can partially account for the associations identified between family structure and child health status. For overnight hospitalization, however, this relationship is strengthened quite a bit after the potential mediators are included in the model. Additional analyses (results not shown) suggest that this is largely due to the inclusion of the measures of material deprivation, suggesting that income is positively related to hospitalization. In cases where the associations between family structure and child health remain

statistically significant, the substantive conclusions are the same as those in the previous models: children living in two married, biological parent families still fare better than those living in less traditional family structures.

Analysis 2: Selection bias and reverse causality

As previously noted, it is possible that the associations identified here represent not a causal relationship between family structure and child health, but rather an unobserved characteristic or series of characteristics that lead certain families both to live in “non-traditional” family structures and to have poorer child health outcomes. We estimate a series of fixed effects models to try to address the possibility that the relationships identified are the result of selection bias. These models assess to what extent a particular change in family structure is associated with a change in child health, after accounting for all other time-invariant characteristics of the child and family. The results from these analyses, presented in Table 4, suggest that a good portion of the cross-sectional associations identified between family structure and child health outcomes is likely due to selection on unobserved or observed time-invariant characteristics. These models suggest that children whose mothers become single between the three- and five-year interviews are more likely than other children to be overweight or obese, and to have been hospitalized overnight in the previous year. The same children, however, are less likely to have been diagnosed with asthma (perhaps due to loss of health insurance coverage and thus fewer doctor’s visits that would provide an opportunity for diagnosis). Children who experience their mothers moving in with a social father are marginally less likely than others to have had an accident or injury requiring medical attention in the previous year. None of the other changes in family structure were significantly associated with children’s health outcomes in the

fixed effect analyses, suggesting that some of the cross-sectional relationships identified between family structure and child health outcomes are likely due to selection bias.

In addition to potentially resulting from selection bias, it is possible that the cross-sectional associations identified between family structure and child health are due to reverse causality; that is, it is possible that children's health status is a cause as well as/rather than a result of family structure. To test this possibility, in Table 5 we present odds ratios from logistic regression models assessing whether child health status at age 3 is a significant predictor of whether children who live with both biological parents at age 3 are still living with both biological parents at age 5. The results demonstrate that only one of the five measures of child health at three years—the mother's rating of the child's overall health—significantly predicts whether the child's biological parents remain in a coresidential relationship at the five year interview. For this outcome, worse reports of child health at 3 years are significantly associated with a reduction in the odds of the parents coresiding at 5 years. This finding is consistent with the reverse causality hypothesis. It should be noted that the fixed effect regression models presented in Table 4 could also potentially suffer from the problem of reverse causality. We do not explicitly test this possibility, however, since we find very few associations between changes in family structure and changes in child health. If we had found that changes in family structure were often associated with changes in child health, then the possibility of reverse causality (i.e., that changes in child health could also lead to changes in family structure) would be of more concern.

DISCUSSION

Previous research documents that children living with two biological parents tend to fare better across a variety of health outcomes than do children living in other family settings. Stress,

lower levels of financial resources, and selection bias have all been proposed as potential explanations for these findings. Little previous research, however, has had the data necessary to examine these processes longitudinally in a recent sample of children living in nontraditional households. The current study takes advantage of data available from the Fragile Families survey to assess the extent to which family structure and instability are associated with adverse child health outcomes at age 5, to what degree such associations can be explained by potential mediating mechanisms, and to what extent selection bias and/or reverse causality may account for these associations.

Overall, our results confirm previous cross-sectional research finding that children living in two married, biological parent families tend to experience better health outcomes than children living in less traditional family situations. Our results also extend this previous research, which has generally focused on older children and adolescents and has often been unable to distinguish between cohabiting versus married biological parents and cohabiting versus married social fathers. Among young children living with both biological parents, those living with cohabiting parents tend to have worse health than those living with married biological parents. The differences we find among other groups are less consistent, and vary considerably across outcomes. Our results also suggest that current family structure is a more powerful predictor of child health status at 5 years than is the mother's history of relationship instability. Although these findings suggest that family structure matters more than family instability for child health outcomes, it is possible that there are certain subgroups of the population for whom a history of instability may serve as an additional source of disadvantage over current family structure. Based on previous research suggesting that particular groups of mothers (e.g., those with relatively low levels of education) may be more affected than others by familial instability, additional analyses

(results not shown) investigated whether instability seemed to matter more for mothers with lower levels of education, for non-white mothers, for mothers with first births and for mothers of boys. The results did not support the hypothesis that a history of familial instability is associated with worse outcomes for particular groups of mothers.

Many previous studies have proposed possible mechanisms through which family structure and instability may impact childhood health status. Familial stress and disorganization, parenting behaviors, and financial resources are a few of the most commonly-cited explanations. Little research, however, has explicitly tested to what extent such factors can explain the association between family structure and child health outcomes. The results presented here suggest that although controlling for such factors sometimes attenuate the relationship between family structure and child health outcomes, these factors cannot fully account for the finding that children in more advantaged family settings tend to have better health outcomes. Results (not shown) using the full case rather than the imputed version of the data found fewer and smaller changes in the odds ratios associated with family structure after the inclusion of the mediator variables, suggesting that these results may be particularly sensitive to missing cases on the mediator variables and that perhaps these results should be interpreted with caution.

Future research should investigate these processes in more detail to determine under what (if any) circumstances these processes do play a mediating role. It should be noted that our results are limited to the extent that there is relatively little variation in health outcomes for children at age 5 since, thankfully, the vast majority of children are healthy at this age. Our findings might differ as children continue to develop and health disparities become more apparent. Additionally, findings from analyses using measures of family structure, the potential

mediators and child health taken at different points in time might also lead to different conclusions.

As previously noted, most of the literature in this area is based on cross-sectional data. Such data cannot address the potential problems of selection bias and reverse causality inherent in this type of research. We utilize the longitudinal data available from the Fragile Families study to assess the degree to which selection bias and reverse causality may be behind the associations identified in our analyses. Fixed effect regression analyses suggest that selection bias may explain a good portion—but likely not all—of the association between family structure and child health outcomes. While this is likely evidence that there is some degree of selection bias at work, other explanations for this finding are also possible. It may be the case that two years is not a long enough time period for the instability and stress (and related processes) associated with changing family structure to impact child health. This seems especially likely, given the fact (as previously noted) that most of the children in the sample remain healthy throughout the observation period. It is also possible that the children who experience a change in family structure between the three- and five-year interviews have already experienced the detrimental effects of living in particular family structures. Those transitioning between three and five years are likely to be those who have also experienced instability and/or lived in non-traditional households prior to that point. In this case, these children may already have poorer health outcomes. If, for example, a child has already been diagnosed with asthma by the time of the three year survey, then this child would not contribute to the “effect” of family structure on child health in the fixed effect analyses, regardless of the role that prior family structure and instability may have played.

In addition to considering the potential role of selection bias, we also address the possibility that reverse causality may explain some of the associations we observe. Previous research (Reichman et al., 2004) suggests that childhood health very early in life is associated with parental relationship status and quality. Our results suggest that, among children living with both biological parents at age 3, those whose mothers report them as being in worse overall health have significantly lower odds than other children of continuing to live with both parents at age 5. We do not find significant associations between the other four measures of child health at age 3 and the odds of the biological parents continuing to coreside.

The analyses presented here suffer from a few limitations. As previously mentioned, the fact that most children are healthy through age five means that there is relatively little variation in our outcomes of interest, making it difficult in some cases to identify significant differences that might exist. Additionally, with the exception of childhood overweight/obese status (for which we find virtually no significant differences by family structure), all of the measures are mother-reported. To the extent that mothers in different family structures differentially report child health status (which could happen for a variety of reasons), this may influence our results. Finally, our analyses are limited by the fact that the longitudinal survey is essentially a series of snapshots rather than an uninterrupted observation period. Although the repeated observations are an improvement over purely cross-sectional data, it is still difficult to get information about all of the relevant events and processes occurring between interviews. We do not, for example, know exactly when between two interviews a child was diagnosed with asthma and whether this occurred before or after a change in family structure occurring during the same interval.

Despite these limitations, the results presented here represent a step forward in our understanding of the impact of family structure early-on in life on children's health outcomes.

While our results confirm previous research suggesting that children living with two married biological parents have generally better health than children living in other family settings, our analyses also suggest that a good portion of these findings may be due to selection bias and/or reverse causality. Rather than changes in family structure causing changes in child health outcomes, it may be the case that other related factors lead to children living in certain types of familial environments that are associated with adverse health outcomes. Future research should identify such factors and investigate the processes through which they may lead to poor child health outcomes. Additionally, it is possible that a clearer link between family instability and child health will emerge as these children get older and more of them begin to experience physical health problems. Although our results do not provide definitive answers to these questions, they do suggest that research in this area suffers greatly from using only cross-sectional data which cannot address these potentially important issues.

WORKS CITED

- Angel, R. & Worobey, J.L. 1988. "Single motherhood and children's health." *Journal of Health and Social Behavior* 29, 38-52.
- Bramlett, M.D. & Blumberg, S.J. 2007. "Family structure and children's physical and mental health." *Health Affairs* 26(2), 549-558.
- Case, A., Fertig, A. & Paxson, C. 2005. "The lasting impact of childhood health and circumstance." *Journal of Health Economics* 24, 365-389.
- Dawson, D.A. 1991. "Family structure and children's health and well-being: Data from the 1988 National Health Interview Survey on Child Health." *Journal of Marriage and the Family*, 53(3), 573-584.
- Mauldon, J. 1990. "The effect of marital disruption on children's health." *Demography* 27(3), 431-446.
- Osborne, C. & McLanahan, S. 2007. "Partnership instability and child well-being." *Journal of Marriage and Family* 69, 1065-1083.
- Reichman, N.E., Corman, H. & Noonan, K. 2004. "Effects of child health on parents' relationship status." *Demography* 41(3), 569-584.
- Reichman, N., Teitler, J., Garfinkel, I. & McLanahan, S. 2001. "Fragile Families: Sample and design." *Children and Youth Services Review*, 23(4/5), 303-326.
- Wood, Goesling & Avellar. 2007. "The Effects of Marriage on Health: A Synthesis of Recent Research Evidence." Mathematica Policy Research Co., reference number 6306-033.

Table 1. Sample descriptives, based on largest analytic sample, $N = 3,387$ (except where otherwise noted)

<u>Child health outcomes at 5 years</u>	
Child overweight/obese (%), $N = 2,142$	17.2
Child diagnosed with asthma (%), $N = 4,048$	23.5
Mother's rating of child's overall health (%), $N = 4,048$	
Excellent	61.8
Very good	26.6
Good	9.5
Fair	2.0
Poor	0.1
Child hospitalized overnight in past year (%), $N = 2,948$	3.1
Child had accident/injury requiring medical attention in past year (%), $N = 2,959$	11.7
<u>Explanatory variables</u>	
Family structure at five years (%)	
Married to biological father	31.8
Married to social father	4.0
Cohabiting with biological father	13.0
Cohabiting with social father	11.7
Living without a partner	39.6
Mother's race/ethnicity (%)	
Non-Hispanic white and other	24.8
Non-Hispanic black	48.7
Hispanic	26.5
Mother's baseline education (%)	
Less than high school/GED	33.0
High school diploma	31.0
Some college or more	36.0
Mother is US-born (%)	84.9
Child is male (%)	52.6
Child born at low/very low birthweight (%)	10.1
Child is mother's first (%)	38.7
Mother's mean baseline age (SD)	25.19 (6.04)
Mother's mean # of relationships before biological father (SD)	2.10 (2.41)
Mother's mean # of residential transitions between birth and five years (SD)	0.85 (1.06)
Mother's mean # of romantic transitions between birth and five years (SD)	1.66 (2.14)

Table 2. Bivariate associations between child health outcomes and family structure at 5 years

	Mother lives with:				
	1) Married bio.	2) Married social	3) Cohab. bio.	4) Cohab. social	5) No partner
Overweight/obese (%)	15.5 ⁵	20.6	17.1	14.4 ⁵	19.1 ^{1,4}
Ever diagnosed with asthma (%)	16.5 ^{2,3,4,5}	27.3 ¹	23.9 ^{1,4}	31.4 ^{1,3,5}	26.2 ^{1,4}
Mother's rating of child's health (%)					
Excellent	67.3 ^{2,3,4,5}	62.1 ¹	57.8 ¹	58.5 ¹	59.6 ¹
Very good	24.6 ^{4,5}	28.0	26.3	28.0 ¹	27.9 ¹
Good	7.5 ^{3,4,5}	7.5 ³	13.3 ^{1,2,4,5}	10.0 ^{1,3}	9.9 ^{1,3}
Fair/Poor	0.7 ^{2,3,4,5}	2.5 ¹	2.7 ¹	3.6 ^{1,5}	2.6 ^{1,4}
Hospitalized overnight in past yr (%)	1.9 ^{2,4,5}	4.5 ^{1,3}	1.9 ^{2,4,5}	4.5 ^{1,3}	3.8 ^{1,3}
Acc./inj. req. med. att'n in past yr (%)	10.5 ⁵	8.0 ^{3,5}	13.0 ^{2,4}	9.7 ^{3,5}	13.1 ^{1,2,4}

Note: The sample is limited to children who lived at least half-time with their biological mothers at the time of the five-year interview. Superscripts indicate that differences between categories are at least marginally different ($p < .1$). Statistical significance is determined using One-Way ANOVAs with Scheffe adjustments for multiple comparisons.

Table 3. Odds ratios from logistic and ordered logistic regressions predicting child health outcomes at age 5

	OBESITY			ASTHMA			HEALTH STATUS (4=FAIR/POOR), ologit			OVERNIGHT HOSP.			ACC./INJ. REQ. MED. ATTN		
Mom's current relationship status (married to bio omitted)															
Married social	1.53	1.48	1.56	1.54 *	1.40	1.39	1.38 ^	1.25	1.20	2.60 ^	4.10 *	4.36 *	0.73	0.74	0.71
Cohabiting bio	1.11	1.11	1.08	1.28 ^	1.27 ^	1.23	1.48 **	1.47 **	1.35 **	0.99	0.99	1.04	1.40 ^	1.40 ^	1.29
Cohabiting social	0.97	0.92	0.92	1.70 **	1.53 **	1.50 *	1.56 **	1.41 *	1.20	2.59 *	4.30 **	5.00 **	0.94	0.96	0.84
Lives alone	1.33 ^	1.27	1.30	1.36 **	1.24 ^	1.22	1.47 **	1.34 **	1.13	2.31 **	3.69 **	4.00 **	1.37 ^	1.39 ^	1.20
# relationship transitions since BL	--	1.02	1.03	--	1.03	1.03	--	1.03	1.02	--	0.84 *	0.84 *	--	0.99	0.98
Mom's baseline age	1.02 ^	1.02 ^	1.02 ^	0.98 *	0.98 *	0.99	1.01 *	1.01 *	1.02 **	1.00	0.99	0.99	1.00	1.00	1.01
Mom's race/ethnicity (non-H white and other omitted)															
Black non-Hispanic	1.35 ^	1.35 ^	1.27	1.77 **	1.77 **	1.77 **	1.21 *	1.20 *	1.10	0.63	0.63	0.56 ^	0.64 **	0.64 **	0.62 **
Hispanic	2.09 **	2.09 **	2.04 **	1.83 **	1.83 **	1.81 **	1.34 **	1.35 **	1.22 *	1.03	1.02	0.96	0.89	0.89	0.85
Mom's baseline education (some college+ omitted)															
Less than HS/GED	1.11	1.10	1.13	1.02	1.01	0.99	1.35 **	1.35 **	1.19 ^	1.15	1.18	1.28	0.92	0.92	0.87
HS Diploma	1.07	1.07	1.03	0.89	0.89	0.87	1.20 *	1.20 *	1.12	0.88	0.89	0.92	0.93	0.93	0.91
# rels before bio	1.02	1.02	1.02	1.00	1.00	1.00	1.00	1.00	0.99	0.96	0.96	0.96	0.96	0.96	0.95 ^
Mom US-born	0.997	0.99	0.96	1.59 **	1.57 **	1.49 **	0.54 **	0.53 **	0.57 **	0.97	1.01	1.01	2.25 **	2.25 **	1.95 **
Child is male	0.86	0.99	0.85	1.51 **	1.51 **	1.50 **	1.25 **	1.24 **	1.23 **	1.17	1.20	1.22	1.38 **	1.38 **	1.35 *
Child born low/very low b.weight	0.74	0.74	0.74	1.69 **	1.70 **	1.68 **	1.48 **	1.48 **	1.43 **	1.44	1.40	1.40	1.09	1.09	1.06
Child is mother's first	1.28 ^	1.28 ^	1.26 ^	0.77 **	0.77 **	0.89 **	0.88 ^	0.88 ^	0.98	1.21	1.20	1.13	0.92	0.92	0.98
Income/material hardship															
Family <100% federal poverty line	--	--	0.68 **	--	--	0.89	--	--	1.12	--	--	0.88	--	--	0.98
Food insecurity in previous year			0.84			1.03			1.11			1.17			1.34 *
Child's health insurance (none omitted)	--	--		--	--		--	--		--	--		--	--	
Public health insurance	--	--	0.65 ^	--	--	0.75 ^	--	--	0.77 *	--	--	0.55	--	--	1.11
Private health insurance	--	--	1.02	--	--	0.94	--	--	1.14	--	--	0.50 *	--	--	1.36
Health care utilization															
Child had 1+ well-child visit in past year	--	--	1.59	--	--	1.14	--	--	1.00	--	--	1.25	--	--	2.75 *
Child has regular source of medical care	--	--	0.91	--	--	1.43	--	--	1.16	--	--		--	--	0.92
Maternal involvement and well-being															
Mother exhibits symptoms of depression	--	--	0.89	--	--	1.15	--	--	1.29	--	--	1.30	--	--	1.40 *
Mother's involvement in activities	--	--	1.12	--	--	1.14 **	--	--	0.85	--	--	1.13	--	--	1.02
Health-related behaviors															
# fast food meals child eats per week	--	--	1.01	--	--	1.07 ^	--	--	1.06	--	--	1.14	--	--	1.17 **
# hours child watches TV on weekend day	--	--	1.04	--	--	0.99	--	--	1.02	--	--	0.98	--	--	1.02
# hours child plays outside on weekend day	--	--	0.98	--	--	0.99	--	--	1.00	--	--	0.87 **	--	--	1.03
# times mother and child moved in past year	--	--	0.85 *	--	--	1.03	--	--	1.04	--	--	0.84	--	--	1.07
N	2142	2142	2142	4048	4048	4048	4048	4048	4048	2948	2948	2948	2959	2959	2959

** p<0.01; * p<0.05; ^ p<0.10 two tailed

Note: The sample is limited to children who lived at least half-time with their biological mothers at the time of the five-year interview.

Table 4. Coefficients from fixed effect logit and OLS models predicting changes in child health outcomes based on changes in family structure, 3-5 years

	Obesity	Asthma	Mother-assessed health (OLS)	Accident/injury req. medical attention	Overnight hospitalization
Transition into:					
Biological parents living together	-0.08	-0.56	0.01	0.18	-0.56
Mother living with social father	-0.07	0.38	-0.02	-0.44 ^	-0.55
Mother living alone	0.42 *	-0.73 *	-0.004	-0.03	0.69 **

** p<0.01; * p<0.05; ^ p<0.10 two tailed

Note: The sample is limited to children who lived at least half-time with their biological mothers at the time of the five-year interview.

Table 5. Odds ratios from logistic regression models predicting biological parent coresidence at 5 years based on child health outcomes at 3 years, among children living with both biological parents at 3 years

Child's health status at 3 years	
Obese/overweight, <i>N</i> = 2,142	0.86
Diagnosed with asthma by 3 years, <i>N</i> = 4,048	0.95
Hospitalized overnight in past year, <i>N</i> = 2,948	0.92
Accident/injury requiring medical attention in past year, <i>N</i> = 2,959	0.87
Overall health status (1=excellent, 4=fair/poor), <i>N</i> = 4,048	0.82 *

** $p < 0.01$; * $p < 0.05$; ^ $p < 0.10$ two tailed

Note: The sample is limited to children who lived at least half-time with their biological mothers at the time of the five-year interview. All models also control for the mother's baseline age, race/ethnicity, educational attainment, the number of romantic relationships she had prior to the biological father, nativity status, and whether the child is male, was born at low/very low birthweight, and whether the focal child is the mother's first birth.