# The Effects of Teenage Childbearing on Long-Term Health in the US: A Twin-Fixed-Effect Approach [*†]

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**Abstract**

This paper explores the effect of teenage childbearing on health outcomes and behaviors of mothers using a nationally representative sample of twins from the Midlife Development in the United States dataset. I employ within-family estimations (fixed-effects approaches) using samples of siblings, twin pairs, and identical twin pairs, to overcome the bias generated by unobserved family background and genetic traits. The results suggest that teenage childbearing does not affect long-term health; however, it adversely affects exercise and preventive care behaviors. Exploring heterogeneous effects suggests that younger-generation teenage mothers engage in less vigorous exercise and are less likely to use preventive care, and the adverse effect on preventive care depends on parental education. Further, I find that the effects of teenage childbearing may operate through education and the quality of the spouse.

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# 1 Introduction

Teenage chilbearing is a public policy concern, especially in countries with high teen birth rates, such as the United States. In the US, the teen birth rate rose from 50-55 births per 1,000 women between the ages of 15 and 19 in the late 1970s to around 60 in the early 1990s. Despite a decline in teen birth rates since 1990s (around 39 in 2009), the rates in the US are still high compared to other developed countries (Kearney and Levine, 2012). Previous research documents that teen mothers are more likely to have less education, lower earnings, and to be welfare dependent, and are less likely to participate in the labor force. However, an open question is whether the effects are caused by teenage childbearing or there are other factors, such as poor socioeconomic status of teen mothers, which drive the adverse associations.

Policy-makers maintain that adverse economic and educational outcomes for mothers and their children are consequences of teen fertility. However, rigorous research does not support that teen childbearing has a causal impact on socioeconomic outcomes. (For a survey of the literature, see Kearney and Levine, 2012.) While there are numerous studies investigating the educational and economic effects of teenage childbearing, there are surprisingly few studies examining the effects on health and health behaviors of mothers. In particular, the question of whether there are effects on health has yet to be explored.

There are several potential explanations for the link between teenage childbearing and health. Teen mothers might invest less in their health due to prenatal health care and delivery costs, and subsequent costs of child rearing. Moreover, the stress associated with delivery complications, stigma of teenage childbearing, and child rearing at a young age might affect mental health.[1] Since teenage motherhood may interfere with education and employment, teen mothers may engage in risky behaviors and have adverse health. Some recent studies find that teen mothers are more likely to report poor physical and mental health (Patel and Sen, 2012; Liao, 2003; Hobcraft and Kiernan, 2001), and are more likely to be current smokers (Hobcraft and Kiernan, 2001). However, teenage

[1] Younger women are at a greater risk of experiencing some pregnancy complications, such as risk of anemia (Mirowsky and Ross, 2002).

childbearing might improve health if the mother or her family and peers are able to allocate greater resources to her health. In particular, motherhood may increase the value of future health and be associated with other changes in lifestyle that reduce risky behavior.

The observed relationships between teenage childbearing and adverse health might be the result of underlying differences between teen and non-teen mothers. For instance, women with disadvantaged backgrounds are more likely to be teen mothers and to experience adverse outcomes even without a child as a teen. In order to address the problem of endogeneity of teenage childbearing on various outcomes, previous studies have used within-family estimations using data on pairs of sisters (Geronimus and Korenman, 1992; Holmlund, 2005), instrumental variables (IV) using twin births and miscarriage as instruments (Klepinger et al., 1999; Bronars and Grogger, 1993; Hotz et al., 2005), and propensity score matching (Chevalier and Viitanen, 2003). To date, only two papers have examined the causal effects on health behaviors of mothers. Webbink et al. (2008) employ the within-family approach, using a sample of Australian twins and their relatives, and find that teenage childbearing leads to adverse health behaviors. However, Fletcher (2012) shows that teenage childbearing has negligible effects on health behaviors of mothers in the US using both within-family (sibling differences) and IV approaches (miscarriage as the instrument).

This paper estimates the causal effect of teenage childbearing (before the age of 20) on long-term health and health behaviors of mothers (aged 25–74 in the US in 1995/96) by using a nationally representative sample of twins as well as siblings from the Midlife Development in the United States (MIDUS) dataset. I employ within-family estimations (fixed-effects approaches) using samples of siblings, twin pairs, and identical twin pairs in order to overcome the bias generated by unobserved family background and genetic traits that affect both the probability of becoming a teenage mother and health.[2] More specifically, I compare the long-term health and health behaviors of teenage mothers to that of their (twin) sisters who had their first child after their teens.

This paper contributes to the literature in several ways. This is the first study to explore the effect of teenage childbearing on health outcomes of teen mothers. Moreover, this paper contributes

[2]It should be noted that heterogeneity within families might bias the effects of teenage childbearing. I address this potential bias in Section 2.

to the small literature on the causal effects of teenage childbearing on health behaviors of mothers in three ways. First, this paper uses a more comprehensive set of health behaviors. Second, I control for possible omitted variables by including controls for early life factors, including birth weight and age at menarche. In addition, the data allow me to explore the effects for smaller samples of twins and siblings who are arguably more alike. For example, unlike the previous two studies, I check the robustness of the estimates by excluding twin pairs that reported large differences in the way they dressed and had different childhood playmates. Finally, this paper explores potential mechanisms through which teenage childbearing influences health behaviors in the context of US, including education, the number of children, marriage, and the spouse's educational attainment. Moreover, unlike the previous two studies, I address the problem of incorrect inference due to multiple outcome variables by re-estimating the effects on overall indices (Kling et al., 2007).

The findings indicate that not controlling for unobserved family background and genetic traits overstates the effect of teenage childbearing on the long-term health and health behaviors of mothers. The significant adverse effects of teenage childbearing on health and health behaviors from cross-section estimations disappear once I control for family fixed effects, except for exercise and preventive care behaviors. More specifically, the results suggest no significant effects of teenage childbearing on self-reported and evaluated health, mental and physical health, chronic conditions, and cancer. Teenage mothers appear to be less likely to have had a blood pressure check in the past 12 months and engage in less vigorous exercise. However, the results suggest no significant effects on other health behaviors, such as smoking, exercise, marijuana use, preventive care utilization, body-mass-index (BMI), health effort, and general health behavior. These results are consistent with the findings of Fletcher (2012), but inconsistent with Webbink et al. (2008). Exploring heterogeneous effects suggests that younger-generation teenage mothers engage in less vigorous exercise and are less likely to use preventive care, and the adverse effect on preventive care depends on parental education. Further, I find that the effects on exercise and preventive care behaviors may operate through reduced educational attainment and matching with a lower "quality" spouse in terms of educational attainment. The increase in overall fertility and the decreased

likelihood of marriage do not appear to account for the effects of teenage childbearing.

The remainder of this paper is organized as follows: Section 2 presents the empirical strategy, Section 3 describes the data and reports summary statistics, Section 4 presents empirical findings, Section 5 provides sensitivity analysis, Section 6 explores potential mechanisms, and Section 7 concludes.

# 2 Empirical Methodology

The within-family estimation uses the following econometric model:

$$y_{ij} = \alpha + \beta T_{ij} + \mathbf{X_{ij}}' \gamma + f_j + \varepsilon_{ij} \tag{1}$$

where $y_{ij}$ is the outcome of individual $i$ in family $j$, $T_{ij}$ is a dummy variable indicating whether the individual is a teenage mother, $\mathbf{X_{ij}}$ is a vector of control variables, $f_j$ is an unobserved family effect common to all siblings (twins) within the same family, and $\varepsilon_{ij}$ is a random error term. The family-specific effect ($f_j$) is removed from equation 1 by differencing between siblings, which removes the bias due to unobservable factors common to all siblings such as family endowments (genetic traits for twins). In this within-family specification (or family fixed effects estimation), it is assumed that differences in the teenage childbearing within siblings are exogenous, conditional on the control variables.

The previous literature points out the potential bias in within-family estimations due to heterogeneity within families. Geronimus and Korenman (1992) acknowledge such heterogeneity in their comparison of sisters for estimating the effects of teenage childbearing on socioeconomics outcomes. Examples of sources of heterogeneity include variations in genetic endowments of siblings and in the way parents treat them (Rosenzweig and Wolpin, 1988). Also, Bound and Solon (1999) emphasize that the differences in individual traits between siblings and in their environments over time are potential sources of bias in estimating returns to schooling. The within-family estimator is less biased than the cross-sectional estimator if the fixed family component accounts

for a larger fraction of the variance in unobserved variables that correlate with both teenage fertility and the outcome than in other unobserved variables that affect the outcome only indirectly through fertility (Holmlund, 2005). I address the possible bias due to heterogeneity within families by using the within-family approach for samples of not only siblings but also twin pairs and identical twin pairs. I also provide several robustness checks: (1) I control for early life factors in the twins sample, more specifically birth weight and age at menarche, (2) I exclude siblings (twins) with large differences in the timing of their first birth, (3) I exclude pairs of sisters where the older sister was a teenage mother, (4) I exclude twins who separated before 15 years old, and (5) I exclude twins who reported large differences in the way they dressed and had different childhood playmates.

Another well-known concern is that the within-family estimator exacerbates measurement errors by differencing between siblings (twins), which may bias the estimates towards zero (Griliches, 1979). In order to deal with measurement error, previous studies on the returns to schooling use various measures of schooling, including a measure of the respondent's schooling reported by the co-twin (Ashenfelter and Krueger, 1994; Ashenfelter and Rouse, 1998). I discuss the issue of measurement error in the robustness checks section.

# 3 Data

The data are from the first wave of the Midlife Development in the United States (MIDUS) survey. The MIDUS is a nationally representative survey of 7,108 non-institutionalized English-speaking individuals aged 25–74 in the US in 1995/96. The sample of 7,108 individuals includes subsamples of 1,914 twins and 950 siblings of the respondents. The total number of female siblings in the sample of at least two sisters is 1,354 of which 768 are female twins (384 pairs).

MIDUS is a rich data set, including respondents' socioeconomic and demographic characteristics, such as age, race, education, family background, number of children, and age at first birth. The data also includes information about health, such as self-reported and evaluated health, mental

and physical health, chronic conditions, and cancer, and health behavior, such as smoking, exercise, marijuana use, preventive care utilization, BMI, health effort, and general health behavior. The sample is restricted to mothers who have a sister (twin) who is also a mother.

The primary independent variable of interest is teenage childbearing, which is a dummy variable indicating whether the women had a child before the age of 20. Other explanatory variables used in the paper are age at survey, race, age at menarche, and birth weight (available only for twins).[3]

The outcome variables are grouped into two categories: "health" and "health behaviors." The health category includes, self-reported and evaluated health, mental and physical health, chronic conditions as well as a dummy variable indicating whether the women had at least 1 chronic condition in the last 12 months, and cancer (a dummy variable indicating whether the women ever had cancer.) The following question is used for self-reported health: "Using a scale from 0 to 10 where 0 means "the worst possible health" and 10 means "the best possible health," how would you rate your health these days?". The question for self-evaluated health is "In general, compared to most men/women your age, would you say your health is much better (1), somewhat better (2), about the same (3), somewhat worse (4), or much worse (5)?" For number of chronic conditions, I sum the number of chronic conditions the respondents had experienced or been treated for in the past 12 months out of 29 chronic conditions (e.g., asthma, bronchitis, high blood pressure). For mental and physical health, I use dummy variables equal to 1 if the women report their physical/mental health is excellent in general and equal to 0 if they say their physical/mental health is very good, good, fair, or poor. The health behaviors category includes smoking, diet, exercise, marijuana use, preventive care, and general health behaviors. Smoking includes currently and ever smoking as well as smoking starting age. For "diet" behavior I use the following measures: the standard BMI, underweight (BMI-score of 18.5 or lower), overweight (BMI-score of 25 or more), and obese (BMI-score of 30 or more). The number of times per month engaged in vigorous (examples in the survey are running or lifting heavy objects) or moderate physical activity (examples in the survey

[3]In the within-family analysis, the controls for age and race difference out of the estimations for the sample of twins; while age remains in the estimations for the sample of siblings.

are bowling or using a vacuum cleaner) are used as measures of exercise behavior. Marijuana use is a dummy variable indicating if the respondent used marijuana or hashish in the past 12 months. For preventive care, I use information on whether or not the respondent takes vitamins or minerals at least a couple times a week, had a blood pressure test in the past 12 months, and visited a doctor in the past 12 months. I use the following question for general health behaviors: "Using a 0 to 10 scale where 0 means "no thought or effort" and 10 means "very much thought and effort," how much thought and effort do you put into your health these days?" and "How strongly you agree with the statement "I work hard at trying to stay healthy" (1 is strongly agree and 7 is disagree strongly).

Tables 1 and 2 report summary statistics (sample means, standard deviations, and proportions) for the sample of women that are mothers and have at least one sister in the sample that is also a mother. There are 968 mothers in the cross-section sample (columns 1-2), of which 223 (23.04%) had their first child before the age of 20. The within-family samples (columns 3-8) includes sisters that have differential timing of their first births (teen and non-teen), which is used to identify the effect of teenage childbearing on various outcomes. The identifying sample for siblings consists of 107 teenage mothers and 121 sisters, while the identifying sample for (identical) twins consists of (27) 67 teenage mothers and their twin sisters.[4]

The number of observations for each variable in Tables 1 and 2 may differ due to missing values, and "starting age smoking" is for the subset of "ever smoke." Columns (1) and (2) of Tables 1 and 2 show that teen mothers are less likely to graduate high school and their parents are also less likely to graduate high school. Non-teen mothers are less likely to have ever had cancer, to be current/ever smokers, to be overweight/underweight/obese, and to use marijuana, are more likely to exercise, start smoking at a later age, have lower BMI-scores, and have better physical and mental health (columns (1) and (2)). Columns (3)-(8) show that the differences between teen mothers and non-teen mothers for almost all outcomes are much smaller than the ones in columns

[4]Note that sample of siblings (twins) where at least one is a teenage mother is used in the analysis, and only siblings (twins) in the identifying samples identify the teenage childbearing coefficient (See Tables 3 and 4 for observation numbers.)

(1)-(2), except for "vigorous physical activity", "blood pressure test", and "starting age smoking."

# 4 Empirical Findings

Tables 3 and 4 present the estimates of the effects of teenage childbearing on health and health behaviors. Columns (1)-(3) report the results of ordinary least squares (OLS) estimation for the cross-section samples of siblings and twins, while columns (4)-(6) report the results of fixed effects (FE) estimation for the samples of siblings, twins, and identical twins (MZ twins) where at least one of the siblings (twins) is a teenage mother. Standard errors are adjusted for clustering within families in the OLS estimations shown in columns (1)-(3). Column (1) of Tables 3 and 4 presents the results of a baseline regression, which excludes any controls, while columns (2) and (3) control for age and race. The within-family estimations for the sample of siblings control for age in column (4), while controls of age and race difference out in columns (5) and (6). The number of observations (groups) used in the estimations for each outcome are also shown in the Tables.

## 4.1 Health

The estimates in columns (1)-(3) of the Table 3 suggest significant and negative associations between teenage childbearing and health for almost all health outcomes. Teenage mothers report worse health, have more chronic conditions, are less likely to report better physical and mental health, are more likely to ever had cancer, and evaluate their health worse than their sisters (twins). However, the effects of teenage childbearing on health disappear once I control for family fixed effects (columns 4-6), except the estimate of the number of chronic conditions for identical twins, which is significant but switches sign.

## 4.2 Health Behaviors

The OLS estimates in columns (1)-(3) of Table 4 suggest that there are significant differences in most health behaviors between teen and non-teen mothers. For instance, teen mothers are 16

percentage points more likely to be current smokers after controlling for age and race (column 2). However, the within-family estimates in columns (4)-(6) suggest no significant effects of teenage childbearing on most health behaviors. The estimates for smoking, obesity, and marijuana use are similar to the estimates obtained in Fletcher (2012), which are in contrast to the findings of Webbink et al. (2008). There is evidence that there is a causal effect of teenage childbearing on exercise and preventive care behavior. Teenage mothers engage in less vigorous exercise and are less likely to use preventive care in terms of "blood pressure test". Note that the within-family estimates for these two outcomes are larger than the cross-sectional estimates. This might be explained by the possibility of different effects of teenage childbearing by various factors, such as parental education. I explore such possibilities in the following subsection.

## 4.3 Inference over Multiple Outcomes

The concern of incorrect inference (increase in Type I error) due to using multiple outcome variables is addressed by re-estimating the effects on overall indices. In order to improve the statistical power, I construct overall indices of health and health behavior using all of the health outcomes for the health index and 11 of the 15 health behaviors for the health behavior index.[5] In order to create the indices, each outcome is rescaled to map higher values to worse health or health behaviors. Then, the z-score of each outcome is calculated by subtracting the mean of mothers who did not have teenage childbearing and dividing by the corresponding standard deviation. The overall indices are obtained by using the principle components analysis (PCA) to determine the weights of standardized health and health behavior outcomes in the indices.[6] Following Kling et al. (2007), an equally weighted average of z-scores is also used to construct the indices; however, the results are consistent with using the PCA method.[7]

Table 3 and 4 present the effects of teenage childbearing on the overall indices of health and

[5] I did not use the outcomes of BMI, underweight, obese, and starting age smoking in creating the health behavior index.

[6] PCA is a statistical technique of data reduction, which converts the correlated variables into an uncorrelated linear combinations of variables (principal components) that account for most of the variance.

[7] Results are available upon request.

health behavior, respectively. The coefficient estimates in columns (1)-(3) of the Tables indicate negative and statistically significant effects of teenage childbearing on health and health behavior. For instance, teenage childbearing worsens health of the mother by 0.6 standard deviation for both samples of siblings and twins. However, the within-family estimates in columns (4)-(6) suggest no significant effects of teenage childbearing on health and health behavior.[8]

## 4.4 Heterogeneous Effects

Panels A, B, and C of Table 5 present the effects of teenage childbearing on health and health behaviors for the samples of siblings and twins using within-family estimations by race, parental education, and age, respectively. In Panels A and B, the dummy for teenage childbearing is interacted with a dummy indicating whether the mother is non-white and with average parental education, respectively.[9] The estimates of the teenage childbearing dummy and the interactions are reported. In Panel C, the sample is divided by the age of the mother (older than 45 or not), and the effects of teenage childbearing are reported for these subsamples. Note that only estimates for selected outcomes, which are significant, are reported in the Table 5.[10]

The results in Panel A suggest that non-white teen mothers report significantly worse self-reported health (about 3 units), are more likely to have at least 1 chronic condition (over 30 percentage points), and are more likely to be underweight (over 20 percentage points). Panel B demonstrates that greater parental education reduces the negative impact of teenage childbearing on health behavior, although the only outcome variable that is significant is the probability of receiving blood pressure test. Panel C demonstrates that teenage childbearing for women that are under of 45 at the time of the survey significantly impacts health behaviors, whereas teenage

[8]Tables A1 and A2 in the Appendix show that the cross-section and within-family estimates of the overall indices are statistically different from each other.

[9]Following Lundborg (2013), average parental education is measured as four categories from 1 to 4: less than high school, GED or high school diploma, some college (no BA degree), and college degree or more. Following the approach of Ashenfelter and Krueger (1994), which is used by Lundborg (2013), the reports of siblings (twins) for parental education are averaged before obtaining a categorical parental education variable to address measurement error. In addition, the report of the sibling (twin) is used if there is only one report.

[10]Results are available for the non-significant outcomes upon request.

childbearing has insignificant effects for women that are over 45. More specifically, for mothers under 45 in the sample, teenage mothers engage in three less vigorous physical activities per month than non-teenage mothers. Similarly, they are around 14 and 17 percentage points less likely to visit a doctor, for the samples of siblings and twins, respectively. One possible explanation is that teenage childbearing adversely impacts health while young, but there is convergence of health over time. Another explanation is that social and economic conditions have changed, making it more difficult for younger generations to cope with teenage childbearing (for example, changes in the labor market have been mostly disfavorable non-high school and non-college educated workers).

These results should not, however, be considered conclusive since in some cases the comparison groups are very small (there are only 25 (12) and 18 (9) non-white mothers (families) in the samples for siblings and twins, respectively) and many of the interactions had the expected signs, but were not statistically significant at all conventional significance levels and therefore not reported.

# 5 Sensitivity Analysis

In this section, I address the various concerns in within-family estimations, which were discussed earlier. First, additional controls are introduced in the estimations for the sample of twins. Second, the effects are re-estimated for smaller samples of siblings and twins excluding arguably different siblings and twins. I also address the possibility that sisters may influence each other's fertility, health, and health behaviors. This section also considers how the estimates are affected by changing the definition of teenage childbearing as well as by using a linear age at first birth variable instead of a dummy variable.

Previous studies have shown that birth weight is an important factor for various long-run outcomes, such as education and income (Behrman and Rosenzweig, 2004; Black et al., 2007). Birth weight is available for only twins in the MIDUS data, and sample means in Table 1 show that teen mothers have lower birth weight, except for twins in the within-family sample. Earlier age at

menarche has been shown to be positively correlated with teenage childbearing (Klepinger et al., 1999; Chevalier and Viitanen, 2003). Sample means in Table 1 show that teen mothers experience slightly earlier menarche compared to non-teen mothers. Controlling for birth weight and age at menarche does not substantially change the main results, and moreover, the effect of teenage childbearing on vigorous physical activity becomes more significant (columns (1) and (2) of Tables 6 and 7).

Following Webbink et al. (2008), I re-estimate the effects for a sample of twins excluding the pairs who differ at least 10 years in the timing of their first birth (10 pairs, of which 4 pairs are identical twins), which is expected to reduce heterogeneity within twins. The results shown in columns (3) and (4) of Tables 6 and 7 are again similar to the main results.

It is plausible that an older sister who has a teenage birth is more likely to influence her younger sister's decisions than the other way around (Holmlund, 2005).[11] As a robustness check, I repeated the regression analysis, excluding sister pairs where the older sister is the teenage mother. Thus, the estimated effects in column (5) of Tables 6 and 7 are identified for siblings where the younger one is a teenage mother, which in turn supposedly reduces the bias due to interactions between sisters. Furthermore, sisters who differ at least 10 years in the timing of their first birth are excluded in order to reduce the heterogeneity bias within sisters. Results for this subsample shown in column (6) of Tables 6 and 7 indicate significant negative effects of teenage childbearing on vigorous exercise behavior (-1.221). Surprisingly, these estimates suggest that teenage childbearing reduces the number of chronic conditions (columns 5-6 in the Table 6).

The identifying assumption that the mother's siblings or twin provides a counterfactual is less likely to hold in cases where siblings display marked differences prior to childbearing or are exposed to different environments, including families and peers. Therefore, I exclude twins who report separation before the age of 15 (7 pairs), report not dressing alike or having dissimilar playmates as children, or both. The results are reported in Tables 8 and 9. The results are not significantly altered by the restrictions and, in particular, the estimates of "vigorous physical activity"

[11] Note that if both sisters have teenage birth, they will not be in the identifying samples.

and "blood pressure test" are robust (-1.426 and -0.148, respectively).

Finally, I use age 19 rather than 20 as the cutoff age for teenage childbearing and use age at first birth as a continuous-type variable.[12] Tables 10 and 11 report the results, where columns (1) and (2) use the baseline age cutoff (see columns (4) and (5) of Tables 3 and 4), columns (3) and (4) use age 19 as the cutoff for teenage childbearing, and columns (5) and (6) employ age at first birth as a linear independent variable. Defining teenage childbearing as having a child before the age of 19 reduces the number of teen mothers to 59 and 35 for siblings and twins, respectively, but it does not significantly affect the results. Using age at first birth as a linear independent variable implies the coefficients have opposite signs, and I find that smoking starting age and having a blood pressure test have the expected signs and are significant.

Measurement errors in the main explanatory variable (teenage childbearing) could bias the estimates towards zero. I use the MIDUS follow-up survey in 2004 to generate an additional age of childbearing observation. The reliability ratio for the sample of twins, defined as the correlation between the two measures of teenage childbearing is 0.928.[13] This ratio is much higher than the ratio of 0.7 obtained in Webbink et al. (2008). A back of the envelope calculation therefore suggests that the downward bias in the estimated twin FE coefficient would be 11%.[14] Thus, it cannot be completely ruled out that measurement errors might have played a role in finding insignificant effects of teenage childbearing. Following Webbink et al. (2008), I address the problem of measurement error by using instrumental variables estimation (IV), in which teenage childbearing is instrumented using the value in the follow-up survey. Consistent with the pattern of the results in the study of Webbink et al. (2008), the IV estimates are generally larger than the main estimation results (also statistical significance of the estimates are similar with the main results).[15] In addition, excluding teenage mothers with childless siblings, who may have children later, might lead

[12] I did not set the threshold to age 18 because the number of teen mothers are significantly reduced (25 and 14 in the samples of siblings and twins). Note that the linear effect of age at first birth is identified by sisters (twins) who differ in the timing of their age at first births by at least one year.

[13] The two measures are different for 5 (3) observations in the sample of twins (identical twins).

[14] Note that measurement error is non-classical since teenage childbearing is a dummy variable. The estimated correlation between the measures of teenage childbearing of a twin and her co-twin is 0.334.

[15] Results are available upon request.

to measurement error (Webbink et al., 2008). The results are robust to the inclusion of siblings and twin pairs where childless mothers become mothers in the follow-up survey.[16]

# 6 Discussion on Mechanisms

This section explores potential mechanisms through which teenage childbearing affects health behaviors of mothers, including education, the number of children, marriage, and the spouse's quality in terms of educational attainment (see Table 13 for the sample means).[17] Towards this end, I employ these mechanisms as additional control variables in determining exercise and preventive care measures.[18] Since I find that there are heterogeneous effects of teenage childbearing on exercise by age, I allow the mechanisms for exercise behavior to vary by age.

The results are presented in Table 12 (columns 1 and 2 present the baseline results for comparison). Columns (3) and (4) demonstrate that including education reduces the effect of teenage childbearing on various outcomes. Moreover, the effect on exercise becomes insignificant and the effect on "blood pressure test" declines in significance, indicating that these variables might be intermediate channels in which teenage childbearing operates. Columns (5)-(8) suggest that the number of children and marriage are not intermediate channels, while columns (9) and (10) suggest that spouse education is a possible channel.

The sample sizes in columns (9) and (10) are reduced due to missing values. The estimates in columns (9) and (10) are smaller than the main results in columns (1) and (2) when the main results are replicated for identical samples.[19]

Hence, reduced education of the mother and the quality of the spouse in terms of educational

[16] Ibid.

[17] Note that the sample means indicate that teenage mothers are less likely to graduate from high school, have more children, are less likely to marry, and are less likely to marry men with more education than high school, compared to non-teen mothers on average.

[18] Educational attainment is measured as four categories from 1 to 4: less than high school (the omitted reference category), GED or high school diploma, some college (no BA degree), and college degree or more. For marriage, I use a dummy indicating whether the respondent is currently married.

[19] For instance, the effect of teenage childbearing on "blood pressure test" is reduced from -0.189 (significant at the 5% level) to -0.171 (significant at the 10% level) for the sample of twins.

attainment are possible mechanisms through which teenage childbearing affects health behaviors.

# 7 Conclusion

This paper explores the causal effects of teenage childbearing on health outcomes and behaviors of mothers in the US by using within-family estimations. While the cross-sectional estimates show significant negative associations between teenage childbearing and health, these relationships mostly disappear once I control for family fixed effects. There is, however, evidence that teenage childbearing adversely affects exercise and preventive care behaviors of mothers. Further, I find that adverse effects of teenage childbearing are isolated to younger generations of mothers in the sample. Similarly, the effect of teenage childbearing is greater for minorities and women with less educated parents.

I address the concern that sibling and twin fixed effects might be heterogeneous within families by controlling for pre-childbearing factors and by restricting the samples to less heterogeneous subsets. The results are mostly robust to controlling for age at menarche and birth weight and to excluding siblings and twins with the following features: large differences in the timing of their first birth, an older sister that was a teenage mother, twins that were separate before the age of 15, and twins that reported large differences in the way they dressed or had different childhood playmates. Finally, the effect on preventive care is not sensitive to using 19 as the cutoff age rather than 20 and to using age at first birth as a linear independent variable.

The main channels in which teenage childbearing affects health behaviors is via reduced educational attainment and lower spouse quality in terms of educational attainment, whereas increased overall fertility and decreased likelihood of marriage do not seem to be important.

To sum up, teenage childbearing does have a causal negative effect on some health behaviors, but not most, and does not seem to affect the health of mothers. This is in contrast to the findings of Webbink et al. (2008), which find that smoking and obesity are affected, but the differences might be due to cross-country differences between Australia and the US as pointed out by Fletcher

(2012). Future research might explore more health outcomes, such as mortality and seek a better understanding of the role of social and institutional factors that interact with teenage childbearing and explain these differences. Finally, the exploration of heterogeneous effects suggests that teenage childbearing might be important for certain subpopulations, thus policymakers might target these subpopulations to optimize the allocation of public finances.

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Table 1: Summary Statistics
Sample means (standard deviations) and proportions

| | Cross-section | | Within-family (Identifying Samples) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Siblings | | Twins | | MZ twins | |
| | (1) Teen Mothers | (2) Nonteen Mothers | (3) Teen Mothers | (4) Nonteen Mothers | (5) Teen Mothers | (6) Nonteen Mothers | (7) Teen Mothers | (8)Nonteen Mothers |
| Age | 49.53 | 48.23 | 49.15 | 49.67 | 46.10 | 46.10 | 43.52 | 43.52 |
| | (11.64) | (12.19) | (12.42) | (12.74) | (12.14) | (12.14) | (9.57) | (9.57) |
| Age at first birth | 17.85 | 24.58 | 18.04 | 23.36 | 18.16 | 23.25 | 18.41 | 23.11 |
| | (1.23) | (3.99) | (1.20) | (3.50) | (1.02) | (3.44) | (0.93) | (3.41) |
| White | 0.92 | 0.95 | 0.93 | 0.94 | 0.92 | 0.92 | 0.96 | 0.96 |
| | (0.27) | (0.23) | (0.25) | (0.24) | (0.27) | (0.27) | (0.19) | (0.19) |
| High school graduate | 0.62 | 0.95 | 0.70 | 0.85 | 0.64 | 0.84 | 0.81 | 0.93 |
| | (0.49) | (0.22) | (0.46) | (0.36) | (0.48) | (0.37) | (0.40) | (0.27) |
| High school graduate, mother | 0.33 | 0.55 | 0.40 | 0.39 | 0.43 | 0.43 | 0.56 | 0.56 |
| | (0.47) | (0.50) | (0.49) | (0.49) | (0.50) | (0.50) | (0.51) | (0.51) |
| High school graduate, father | 0.29 | 0.49 | 0.32 | 0.32 | 0.35 | 0.35 | 0.44 | 0.44 |
| | (0.45) | (0.50) | (0.47) | (0.47) | (0.48) | (0.48) | (0.51) | (0.51) |
| Age at menarche | 12.59 | 12.82 | 12.38 | 12.79 | 12.25 | 12.95 | 12.27 | 12.60 |
| | (1.45) | (1.58) | (1.45) | (1.66) | (1.39) | (1.98) | (1.54) | (1.78) |
| Birth weight | 2376.63 | 2380.01 | - | - | 2462.86 | 2427.85 | 2381.36 | 2393.17 |
| | (676.94) | (635.06) | - | - | (609.48) | (650.95) | (534.76) | (669.29) |
| *Health Outcomes* | | | | | | | | |
| Self Reported Health | 7.20 | 7.73 | 7.30 | 7.50 | 7.42 | 7.63 | 7.67 | 7.83 |
| | (1.93) | (1.55) | (2.09) | (1.66) | (2.14) | (1.75) | (2.08) | (1.49) |
| # of Chronic Conditions | 3.12 | 2.48 | 2.79 | 3.17 | 2.62 | 3.15 | 2.17 | 3.29 |
| | (3.06) | (2.43) | (2.55) | (2.85) | (2.37) | (3.05) | (1.86) | (2.74) |
| At least 1 Chronic Condition | 0.80 | 0.77 | 0.78 | 0.81 | 0.77 | 0.80 | 0.71 | 0.79 |
| | (0.40) | (0.42) | (0.42) | (0.39) | (0.43) | (0.40) | (0.46) | (0.41) |
| Physical Health | 0.10 | 0.20 | 0.11 | 0.14 | 0.14 | 0.17 | 0.22 | 0.26 |
| | (0.30) | (0.40) | (0.32) | (0.35) | (0.35) | (0.38) | (0.42) | (0.45) |
| Mental Health | 0.19 | 0.28 | 0.19 | 0.20 | 0.18 | 0.25 | 0.26 | 0.37 |
| | (0.39) | (0.45) | (0.39) | (0.40) | (0.39) | (0.44) | (0.45) | (0.49) |
| Self Evaluated Health | 2.49 | 2.21 | 2.42 | 2.27 | 2.44 | 2.32 | 2.30 | 2.19 |
| | (1.00) | (0.89) | (1.02) | (0.91) | (1.04) | (0.91) | (0.91) | (0.96) |
| Ever Had Cancer | 0.15 | 0.09 | 0.13 | 0.10 | 0.09 | 0.03 | 0.07 | 0.00 |
| | (0.36) | (0.29) | (0.34) | (0.30) | (0.29) | (0.17) | (0.27) | (0.00) |
| Observations | 223 | 745 | 107 | 121 | 67 | 67 | 27 | 27 |

*Notes:* The "cross-section" sample consists of mothers who have a sister in the sample who is also a mother. The "within-family" samples consist of sisters who differ in the timing of their first births (teen mother vs nonteen mother). Birth weight is available for twins.

Table 2: Summary Statistics of Health Behaviors
Sample means (standard deviations) and proportions

| | Cross-section | | Within-family (Identifying Samples) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Siblings | | Twins | | MZ twins | |
| | (1) Teen Mothers | (2) Nonteen Mothers | (3) Teen Mothers | (4) Nonteen Mothers | (5) Teen Mothers | (6) Nonteen Mothers | (7) Teen Mothers | (8)Nonteen Mothers |
| *Smoking* | | | | | | | | |
| Current Smoker | 0.34 | 0.18 | 0.28 | 0.28 | 0.33 | 0.35 | 0.33 | 0.44 |
| | (0.48) | (0.39) | (0.45) | (0.45) | (0.48) | (0.48) | (0.48) | (0.51) |
| Ever Smoker | 0.55 | 0.42 | 0.48 | 0.52 | 0.53 | 0.53 | 0.52 | 0.59 |
| | (0.50) | (0.49) | (0.50) | (0.50) | (0.50) | (0.50) | (0.51) | (0.50) |
| Starting Age Smoking | 18.38 | 19.20 | 17.79 | 19.23 | 17.00 | 18.36 | 17.38 | 18.85 |
| | (4.79) | (4.21) | (4.06) | (4.69) | (3.92) | (4.84) | (3.07) | (5.77) |
| *Diet* | | | | | | | | |
| BMI | 27.41 | 25.71 | 27.44 | 26.35 | 26.39 | 25.96 | 26.90 | 26.53 |
| | (6.27) | (5.16) | (6.75) | (5.61) | (6.68) | (4.84) | (4.98) | (4.57) |
| Underweight (bmi<=18.5) | 0.04 | 0.02 | 0.04 | 0.04 | 0.05 | 0.04 | 0.09 | 0.05 |
| | (0.19) | (0.15) | (0.21) | (0.19) | (0.23) | (0.19) | (0.29) | (0.21) |
| Overweight (bmi>=25) | 0.56 | 0.47 | 0.58 | 0.54 | 0.48 | 0.57 | 0.59 | 0.73 |
| | (0.50) | (0.50) | (0.50) | (0.50) | (0.50) | (0.50) | (0.50) | (0.46) |
| Obese (bmi>=30) | 0.29 | 0.19 | 0.25 | 0.24 | 0.14 | 0.21 | 0.18 | 0.27 |
| | (0.45) | (0.39) | (0.44) | (0.43) | (0.35) | (0.41) | (0.39) | (0.46) |
| *Exercise* | | | | | | | | |
| Vigorous Physical Activity | 4.32 | 5.20 | 4.57 | 5.66 | 4.90 | 6.22 | 5.22 | 7.44 |
| | (4.85) | (5.13) | (4.93) | (5.34) | (5.10) | (5.59) | (5.15) | (5.49) |
| Moderate Physical Activity | 8.28 | 9.83 | 8.98 | 9.67 | 9.75 | 9.56 | 9.88 | 11.94 |
| | (4.93) | (4.57) | (4.92) | (4.65) | (4.74) | (4.76) | (4.66) | (3.27) |
| *Marijuana Use* | | | | | | | | |
| Marijuana Use | 0.05 | 0.02 | 0.03 | 0.01 | 0.03 | 0.02 | 0.00 | 0.00 |
| | (0.22) | (0.15) | (0.18) | (0.10) | (0.18) | (0.13) | (0.00) | (0.00) |
| *Preventive Care* | | | | | | | | |
| Vitamin Take | 0.56 | 0.55 | 0.56 | 0.54 | 0.52 | 0.46 | 0.50 | 0.50 |
| | (0.50) | (0.50) | (0.50) | (0.50) | (0.50) | (0.50) | (0.51) | (0.51) |
| Blood Pressure Test | 0.81 | 0.84 | 0.78 | 0.87 | 0.74 | 0.86 | 0.67 | 0.85 |
| | (0.39) | (0.37) | (0.42) | (0.34) | (0.44) | (0.35) | (0.48) | (0.36) |
| Doctor Visit | 0.83 | 0.90 | 0.84 | 0.87 | 0.79 | 0.88 | 0.87 | 0.96 |
| | (0.38) | (0.30) | (0.37) | (0.33) | (0.41) | (0.33) | (0.34) | (0.21) |
| *Health Behavior* | | | | | | | | |
| Work hard to stay healthy | 2.38 | 2.20 | 2.32 | 2.28 | 2.18 | 2.29 | 2.29 | 1.92 |
| | (1.36) | (1.22) | (1.28) | (1.56) | (1.16) | (1.42) | (1.46) | (0.72) |
| Effort on health | 7.46 | 7.49 | 7.54 | 7.74 | 7.59 | 7.88 | 7.08 | 7.88 |
| | (2.13) | (1.90) | (2.14) | (2.01) | (2.20) | (1.86) | (2.15) | (1.51) |
| Observations | 223 | 745 | 107 | 121 | 67 | 67 | 27 | 27 |

*Notes:* The "cross-section" sample consists of mothers who have a sister in the sample who is also a mother. The "within-family" samples consist of sisters who differ in the timing of their first births (teen mother vs nonteen mother).

Table 3: Effects of teenage childbearing on health

| | Cross-Section | | | Within-family | | |
|---|---|---|---|---|---|---|
| | (1) Siblings | (2) Siblings | (3) Twins | (4) Siblings | (5) Twins | (6) MZ Twins |
| Self Reported Health | -0.533*** | -0.530*** | -0.596*** | -0.171 | -0.203 | -0.167 |
| | (0.147) | (0.147) | (0.200) | (0.218) | (0.308) | (0.432) |
| *Observations (Groups)* | 892 | 890 | 462 | 328 (152) | 182 (91) | 74 (37) |
| # of Chronic Conditions | 0.642*** | 0.579*** | 0.704** | -0.468 | -0.533 | -1.125** |
| | (0.258) | (0.254) | (0.355) | (0.327) | (0.403) | (0.473) |
| *Observations (Groups)* | 903 | 901 | 468 | 333 (154) | 184 (92) | 74 (37) |
| Chronic Condition | 0.033 | 0.023 | 0.017 | -0.031 | -0.033 | -0.083 |
| | (0.033) | (0.032) | (0.044) | (0.045) | (0.065) | (0.082) |
| *Observations (Groups)* | 903 | 901 | 468 | 333 (154) | 184 (92) | 74 (37) |
| Physical Health | -0.103*** | -0.105*** | -0.078** | -0.0325 | -0.030 | -0.037 |
| | (0.026) | (0.025) | (0.035) | (0.036) | (0.048) | (0.075) |
| *Observations (Groups)* | 960 | 952 | 516 | 354 (163) | 202 (101) | 80 (40) |
| Mental Health | -0.090*** | -0.093*** | -0.098** | -0.044 | -0.075 | -0.111 |
| | (0.032) | (0.032) | (0.042) | (0.048) | (0.060) | (0.105) |
| *Observations (Groups)* | 964 | 956 | 520 | 356 (164) | 204 (102) | 80 (40) |
| Self Evaluated Health | 0.276*** | 0.321*** | 0.225** | 0.042 | 0.121 | 0.111 |
| | (0.075) | (0.073) | (0.097) | (0.109) | (0.147) | (0.220) |
| *Observations (Groups)* | 942 | 936 | 506 | 352 (162) | 200 (100) | 78 (39) |
| Ever Had Cancer | 0.058** | 0.052** | 0.057 | 0.058 | 0.060 | 0.074 |
| | (0.026) | (0.026) | (0.035) | (0.036) | (0.040) | (0.060) |
| *Observations (Groups)* | 964 | 956 | 520 | 356 (164) | 204 (102) | 80 (40) |
| Overall Index | 0.624*** | 0.613*** | 0.592*** | 0.065 | 0.166 | 0.070 |
| | (0.137) | (0.137) | (0.162) | (0.178) | (0.221) | (0.279) |
| *Observations (Groups)* | 964 | 956 | 520 | 356 (164) | 204 (102) | 80 (40) |
| Controls | | | | | | |
| Age | No | Yes | Yes | Yes | - | - |
| Race | No | Yes | Yes | - | - | - |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are in parentheses. Standard errors are adjusted for clustering within families in the "cross-section" regressions.

Table 4: Effects of teenage childbearing on health behaviors

| | Cross-Section | | | Within-family | | |
|---|---|---|---|---|---|---|
| | (1) Siblings | (2) Siblings | (3) Twins | (4) Siblings | (5) Twins | (6) MZ Twins |
| *Smoking* | | | | | | |
| Current Smoker | 0.160*** | 0.161*** | 0.182*** | -0.013 | -0.015 | -0.111 |
| | (0.037) | (0.037) | (0.050) | (0.051) | (0.059) | (0.073) |
| *Observations (Groups)* | 962 | 954 | 518 | 352 (163) | 202 (101) | 80 (40) |
| Ever Smoker | 0.130*** | 0.127*** | 0.197*** | -0.055 | -0.000 | -0.074 |
| | (0.041) | (0.041) | (0.053) | (0.053) | (0.067) | (0.081) |
| *Observations (Groups)* | 962 | 954 | 518 | 352 (163) | 202 (101) | 80 (40) |
| Starting Age Smoking | -0.821 | -0.915 | -0.493 | -1.644** | -1.360 | -1.462 |
| | (0.581) | (0.588) | (0.734) | (0.838) | (1.084) | (1.562) |
| *Observations (Groups)* | 315 | 312 | 174 | 138 (68) | 86 (43) | 38 (19) |
| *Diet* | | | | | | |
| BMI | 1.699*** | 1.671*** | 1.956*** | 0.439 | 0.424 | 0.370 |
| | (0.527) | (0.526) | (0.732) | (0.609) | (0.771) | (0.671) |
| *Observations (Groups)* | 846 | 844 | 426 | 313 (145) | 172 (86) | 68 (34) |
| Underweight (bmi<=18.5) | 0.014 | 0.015 | 0.029 | 0.002 | 0.018 | 0.045 |
| | (0.014) | (0.014) | (0.022) | (0.022) | (0.035) | (0.052) |
| *Observations (Groups)* | 846 | 844 | 426 | 313 (145) | 172 (86) | 68 (34) |
| Overweight (bmi>=25) | 0.095** | 0.091** | 0.098* | -0.002 | -0.089 | -0.136 |
| | (0.044) | (0.044) | (0.053) | (0.056) | (0.072) | (0.102) |
| *Observations (Groups)* | 846 | 844 | 426 | 313 (145) | 172 (86) | 68 (34) |
| Obese (bmi>=30) | 0.101*** | 0.099*** | 0.079 | -0.034 | -0.071 | -0.091 |
| | (0.038) | (0.038) | (0.050) | (0.046) | (0.056) | (0.097) |
| *Observations (Groups)* | 846 | 844 | 426 | 313 (145) | 172 (86) | 68 (34) |
| *Exercise* | | | | | | |
| Vigorous Physical Activity | -0.874** | -0.760** | -0.209 | -0.807 | -1.319* | -2.219* |
| | (0.384) | (0.381) | (0.533) | (0.563) | (0.782) | (1.192) |
| *Observations (Groups)* | 891 | 889 | 458 | 327 (151) | 178 (89) | 74 (37) |
| Moderate Physical Activity | -1.555*** | -1.392*** | -0.858* | -0.909 | 0.194 | -2.063* |
| | (0.405) | (0.397) | (0.515) | (0.558) | (0.750) | (1.109) |
| *Observations (Groups)* | 894 | 892 | 462 | 326 (151) | 178 (89) | 72 (36) |
| *Marijuana Use* | | | | | | |
| Marijuana Use | 0.027 | 0.030* | 0.015 | 0.016 | 0.017 | - |
| | (0.017) | (0.017) | (0.019) | (0.022) | (0.031) | - |
| *Observations (Groups)* | 896 | 894 | 464 | 327 (151) | 180 (90) | 74 (37) |
| *Preventive Care* | | | | | | |
| Vitamin Take | 0.009 | 0.004 | 0.012 | 0.063 | 0.054 | -0.000 |
| | (0.040) | (0.039) | (0.051) | (0.066) | (0.100) | (0.140) |
| *Observations (Groups)* | 889 | 887 | 454 | 323 (149) | 174 (87) | 74 (37) |
| Blood Pressure Test | -0.030 | -0.028 | -0.038 | -0.096** | -0.123** | -0.185* |
| | (0.033) | (0.032) | (0.040) | (0.043) | (0.061) | (0.103) |
| *Observations (Groups)* | 945 | 939 | 506 | 348 (161) | 198 (99) | 80 (40) |
| Doctor Visit | -0.075*** | -0.073*** | -0.087** | -0.035 | -0.088 | -0.087 |
| | (0.028) | (0.028) | (0.040) | (0.050) | (0.074) | (0.106) |
| *Observations (Groups)* | 885 | 883 | 452 | 322 (149) | 172 (86) | 70 (35) |
| *Health Behavior* | | | | | | |
| Work hard to stay healthy | 0.180 | 0.209* | 0.083 | 0.074 | -0.109 | 0.375 |
| | (0.117) | (0.115) | (0.153) | (0.184) | (0.227) | (0.290) |
| *Observations (Groups)* | 853 | 851 | 432 | 306 (141) | 160 (80) | 74 (37) |
| Effort on health | -0.033 | -0.102 | -0.186 | -0.145 | -0.288 | -0.792 |
| | (0.177) | (0.173) | (0.234) | (0.260) | (0.362) | (0.530) |
| *Observations (Groups)* | 892 | 890 | 460 | 329 (152) | 182 (91) | 74 (37) |
| Overall Index | 0.560*** | 0.559*** | 0.574*** | 0.119 | 0.114 | 0.073 |
| | (0.119) | (0.120) | (0.168) | (0.167) | (0.224) | (0.289) |
| *Observations (Groups)* | 962 | 954 | 518 | 352 (163) | 202 (101) | 80 (40) |
| Controls | | | | | | |
| Age | No | Yes | Yes | Yes | - | - |
| Race | No | Yes | Yes | - | - | - |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are in parentheses. Standard errors are adjusted for clustering within families in the "cross-section" regressions.

Table 5: Effects of teenage childbearing by race, parental education, and age (FE)

| | (1) Siblings | | (2) Twins | |
|---|---|---|---|---|
| **Panel A. By Race** | Effects on | | Effects on | |
| | Teen Mother | Nonwhite*Teen Mother | Teen Mother | Nonwhite*Teen Mother |
| Self Reported Health | 0.010 | -2.785*** | 0.056 | -3.056*** |
| | (0.219) | (0.863) | (0.863) | (1.063) |
| *Observations (Groups)* | | 328 (152) | | 182 (91) |
| Chronic Condition | -0.052 | 0.325* | -0.073 | 0.473** |
| | (0.046) | (0.184) | (0.067) | (0.230) |
| *Observations (Groups)* | | 333 (154) | | 184 (92) |
| Underweight (bmi<=18.5) | -0.007 | 0.191* | 0.000 | 0.333** |
| | (0.022) | (0.100) | (0.036) | (0.154) |
| *Observations (Groups)* | | 313 (145) | | 172 (86) |
| **Panel B. By Parental Education** | Effects on | | Effects on | |
| | Teen Mother | Parent Educ*Teen Mother | Teen Mother | Parent Educ*Teen Mother |
| Blood Pressure Test | -0.317*** | 0.055* | -0.372** | 0.057 |
| | (0.112) | (0.029) | (0.169) | (0.041) |
| *Observations (Groups)* | | 320 (147) | | 176 (88) |
| **Panel C. By Age** | Effect on Teen Mother | | Effect on Teen Mother | |
| | Age<=45 | Age>45 | Age<=45 | Age>45 |
| Vigorous Physical Activity | -3.183*** | 0.510 | -3.231** | 0.347 |
| | (1.066) | (0.688) | (1.229) | (1.011) |
| Observations (Groups) | 113 (62) | 214 (104) | 76 (38) | 102 (51) |
| Doctor Visit | -0.140* | 0.018 | -0.172* | 0.000 |
| | (0.079) | (0.065) | (0.096) | (0.111) |
| Observations (Groups) | 115 (63) | 207 (101) | 78 (39) | 94 (47) |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are in parentheses. Regressions for the sample of siblings control for age.

Table 6: Effects of teenage childbearing on health-Additional Controls or Sample Restrictions

| | Birth weight and age at menarche | | Difference in age at first birth (DAFB) <10 years | | Exclude oldest sisters teen mothers | Exclude oldest sisters teen mothers and DAFB>=10 years |
|---|---|---|---|---|---|---|
| | (1) Twins | (2) MZ Twins | (3) Twins | (4) MZ Twins | (5) Siblings | (6) Siblings |
| Self Reported Health | -0.230 | -0.272 | -0.347 | -0.350 | -0.015 | -0.159 |
| | (0.329) | (0.452) | (0.337) | (0.482) | (0.243) | (0.266) |
| *Observations (Groups)* | 180 (90) | 74 (37) | 162 (81) | 66 (33) | 267 (126) | 234 (110) |
| # of Chronic Conditions | -0.543 | -1.116** | -0.620 | -1.250** | -0.696** | -0.918** |
| | (0.437) | (0.521) | (0.462) | (0.543) | (0.326) | (0.370) |
| *Observations (Groups)* | 182 (91) | 74 (37) | 164 (82) | 66 (33) | 272 (128) | 239 (112) |
| Chronic Condition | -0.043 | -0.068 | 0.000 | -0.100 | -0.056 | -0.044 |
| | (0.070) | (0.089) | (0.072) | (0.095) | (0.049) | (0.054) |
| *Observations (Groups)* | 182 (91) | 74 (37) | 164 (82) | 66 (33) | 272 (128) | 239 (112) |
| Physical Health | 0.007 | 0.014 | -0.036 | -0.043 | -0.036 | -0.050 |
| | (0.052) | (0.084) | (0.051) | (0.070) | (0.038) | (0.041) |
| *Observations (Groups)* | 188 (97) | 76 (38) | 182 (91) | 72 (36) | 291 (137) | 256 (120) |
| Mental Health | -0.043 | -0.103 | -0.070 | -0.087 | -0.010 | -0.026 |
| | (0.066) | (0.114) | (0.068) | (0.116) | (0.050) | (0.056) |
| *Observations (Groups)* | 188 (97) | 76 (38) | 184 (92) | 72 (36) | 293 (138) | 258 (121) |
| Self Evaluated Health | 0.104 | 0.068 | 0.125 | 0.043 | 0.028 | 0.109 |
| | (0.169) | (0.256) | (0.162) | (0.242) | (0.120) | (0.135) |
| *Observations (Groups)* | 186 (93) | 74 (37) | 180 (90) | 70 (35) | 291 (136) | 254 (119) |
| Ever Had Cancer | 0.050 | 0.076 | 0.053 | 0.043 | 0.065* | 0.068 |
| | (0.046) | (0.072) | (0.044) | (0.061) | (0.038) | (0.043) |
| *Observations (Groups)* | 188 (97) | 76 (38) | 184 (92) | 72 (36) | 295 (138) | 260 (121) |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are in parentheses. Columns (5) and (6) control for age.

Table 7: Effects of teenage childbearing on health behaviors-Additional Controls or Sample Restrictions

| | Birth weight and age at menarche | | Difference in age at first birth (DAFB) <10 years | | Exclude oldest sisters teen mothers | Exclude oldest sisters teen mothers and DAFB >=10 years |
|---|---|---|---|---|---|---|
| | (1) Twins | (2) MZ Twins | (3) Twins | (4) MZ Twins | (5) Siblings | (6) Siblings |
| *Smoking* | | | | | | |
| Current Smoker | 0.006 | -0.098 | 0.018 | -0.087 | -0.020 | 0.007 |
| | (0.077) | (0.080) | (0.073) | (0.077) | (0.053) | (0.057) |
| *Observations (Groups)* | 188 (97) | 76 (38) | 182 (91) | 72 (36) | 293 (137) | 258 (120) |
| Ever Smoker | 0.023 | -0.024 | -0.000 | -0.043 | -0.034 | -0.010 |
| | (0.075) | (0.091) | (0.072) | (0.086) | (0.056) | (0.062) |
| *Observations (Groups)* | 188 (97) | 76 (38) | 182 (91) | 72 (36) | 293 (137) | 258 (120) |
| Starting Age Smoking | -2.516* | -3.883* | -0.333 | -0.583 | -1.294 | -1.241 |
| | (1.356) | (1.812) | (1.144) | (1.487) | (0.858) | (1.007) |
| *Observations (Groups)* | 80 (40) | 36 (18) | 78 (39) | 36 (18) | 118 (58) | 102 (51) |
| *Diet* | | | | | | |
| BMI | 0.354 | 0.154 | 0.356 | 0.770 | 0.649 | 1.120 |
| | (0.809) | (0.723) | (0.877) | (0.759) | (0.650) | (0.726) |
| *Observations (Groups)* | 170 (85) | 68 (34) | 152 (76) | 60 (30) | 254 (119) | 223 (104) |
| Underweight (bmi<=18.5) | 0.028 | 0.074 | 0.022 | 0.056 | -0.008 | -0.018 |
| | (0.038) | (0.056) | (0.042) | (0.061) | (0.027) | (0.030) |
| *Observations (Groups)* | 170 (85) | 68 (34) | 152 (76) | 60 (30) | 254 (119) | 223 (104) |
| Overweight (bmi>=25) | -0.115 | -0.128 | -0.065 | -0.056 | -0.014 | 0.002 |
| | (0.077) | (0.114) | (0.078) | (0.107) | (0.059) | (0.066) |
| *Observations (Groups)* | 170 (85) | 68 (34) | 152 (76) | 60 (30) | 254 (119) | 223 (104) |
| Obese (bmi>=30) | -0.072 | -0.081 | -0.065 | -0.056 | -0.009 | 0.006 |
| | (0.060) | (0.108) | (0.063) | (0.107) | (0.051) | (0.058) |
| *Observations (Groups)* | 170 (85) | 68 (34) | 152 (76) | 60 (30) | 254 (119) | 223 (104) |
| *Exercise* | | | | | | |
| Vigorous Physical Activity | -1.918** | -2.833** | -1.714* | -3.113** | -1.051 | -1.221* |
| | (0.838) | (1.288) | (0.897) | (1.259) | (0.636) | (0.728) |
| *Observations (Groups)* | 176 (88) | 74 (37) | 158 (79) | 66 (33) | 266 (125) | 233 (109) |
| Moderate Physical Activity | 0.126 | -2.332* | 0.141 | -2.475** | -0.623 | -0.580 |
| | (0.790) | (1.219) | (0.846) | (1.172) | (0.633) | (0.713) |
| *Observations (Groups)* | 176 (88) | 72 (36) | 158 (79) | 64 (32) | 265 (125) | 232 (109) |
| *Marijuana Use* | | | | | | |
| Marijuana Use | 0.006 | - | 0.021 | - | 0.016 | 0.016 |
| | (0.034) | - | (0.036) | - | (0.024) | (0.028) |
| *Observations (Groups)* | 178 (89) | 74 (37) | 160 (80) | 66 (33) | 266 (125) | 233 (109) |
| *Preventive Care* | | | | | | |
| Vitamin Take | 0.091 | 0.082 | 0.043 | -0.050 | 0.061 | 0.045 |
| | (0.104) | (0.149) | (0.108) | (0.148) | (0.075) | (0.084) |
| *Observations (Groups)* | 172 (86) | 74 (37) | 154 (77) | 66 (33) | 262 (123) | 229 (107) |
| Blood Pressure Test | -0.106 | -0.077 | -0.109 | -0.174 | -0.067 | -0.073 |
| | (0.068) | (0.112) | (0.068) | (0.113) | (0.049) | (0.053) |
| *Observations (Groups)* | 184 (92) | 76 (38) | 178 (89) | 72 (36) | 289 (135) | 254 (118) |
| Doctor Visit | -0.069 | -0.102 | -0.064 | -0.053 | -0.015 | -0.009 |
| | (0.080) | (0.119) | (0.080) | (0.118) | (0.055) | (0.060) |
| *Observations (Groups)* | 172 (86) | 70 (35) | 152 (76) | 62 (31) | 261 (123) | 228 (107) |
| *Health Behavior* | | | | | | |
| Work hard to stay healthy | -0.114 | 0.329 | -0.109 | 0.500 | -0.063 | -0.035 |
| | (0.242) | (0.316) | (0.255) | (0.332) | (0.208) | (0.220) |
| *Observations (Groups)* | 158 (79) | 68 (34) | 142 (71) | 60 (30) | 246 (115) | 215 (100) |
| Effort on health | -0.164 | -0.930 | -0.265 | -0.650 | -0.107 | -0.186 |
| | (0.381) | (0.561) | (0.398) | (0.558) | (0.299) | (0.326) |
| *Observations (Groups)* | 180 (90) | 74 (37) | 162 (81) | 66 (33) | 268 (126) | 235 (110) |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are in parentheses. Columns (5) and (6) control for age.

Table 8: Effects of teenage childbearing on health-Twins Sample Restrictions

| | Exclude twins separated before 15 years old | Exlude twins never dress alike | Exlude twins never have same playmates | Exlude twins never dress alike or never have same playmates |
|---|---|---|---|---|
| | (1) Twins | (2) Twins | (3) Twins | (4) Twins |
| Self Reported Health | -0.304 | -0.288 | -0.093 | -0.250 |
| | (0.309) | (0.330) | (0.325) | (0.327) |
| *Observations (Groups)* | 168 (84) | 162 (81) | 170 (85) | 162 (81) |
| # of Chronic Conditions | -0.404 | -0.566 | -0.352 | -0.385 |
| | (0.411) | (0.425) | (0.391) | (0.403) |
| *Observations (Groups)* | 170 (85) | 164 (82) | 170 (85) | 162 (81) |
| Chronic Condition | -0.035 | -0.075 | -0.019 | -0.038 |
| | (0.068) | (0.068) | (0.070) | (0.069) |
| *Observations (Groups)* | 170 (85) | 164 (82) | 170 (85) | 162 (81) |
| Physical Health | -0.032 | -0.018 | -0.017 | -0.035 |
| | (0.050) | (0.051) | (0.050) | (0.055) |
| *Observations (Groups)* | 188 (94) | 178 (89) | 188 (94) | 178 (89) |
| Mental Health | -0.078 | -0.017 | -0.066 | -0.052 |
| | (0.064) | (0.062) | (0.064) | (0.065) |
| *Observations (Groups)* | 190 (95) | 180 (90) | 190 (95) | 180 (90) |
| Self Evaluated Health | 0.190 | 0.070 | 0.050 | 0.053 |
| | (0.145) | (0.160) | (0.152) | (0.157) |
| *Observations (Groups)* | 186 (93) | 176 (88) | 186 (93) | 176 (88) |
| Ever Had Cancer | 0.063 | 0.017 | 0.049 | 0.034 |
| | (0.042) | (0.039) | (0.041) | (0.042) |
| *Observations (Groups)* | 190 (95) | 180 (90) | 190 (95) | 180 (90) |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are in parentheses.

Table 9: Effects of teenage childbearing on health behaviors-Twins Sample Restrictions

| | Exclude twins separated before 15 years old | Exlude twins never dress alike | Exlude twins never have same playmates | Exlude twins never dress alike or never have same playmates |
|---|---|---|---|---|
| | (1) Twins | (2) Twins | (3) Twins | (4) Twins |
| *Smoking* | | | | |
| Current Smoker | 0.000 | -0.070 | -0.033 | -0.048 |
| | (0.070) | (0.073) | (0.072) | (0.071) |
| *Observations (Groups)* | 188 (94) | 178 (89) | 188 (94) | 192 (96) |
| Ever Smoker | 0.016 | -0.053 | -0.000 | 0.000 |
| | (0.069) | (0.072) | (0.071) | (0.069) |
| *Observations (Groups)* | 188 (94) | 178 (89) | 188 (94) | 192 (96) |
| Starting Age Smoking | -1.391 | -2.000* | -1.318 | -1.375 |
| | (1.188) | (1.066) | (1.205) | (1.126) |
| *Observations (Groups)* | 76 (38) | 74 (37) | 78 (39) | 82 (41) |
| *Diet* | | | | |
| BMI | 0.485 | 0.105 | 0.598 | 0.534 |
| | (0.802) | (0.702) | (0.813) | (0.793) |
| *Observations (Groups)* | 160 (80) | 152 (76) | 160 (80) | 164 (82) |
| Underweight (bmi<=18.5) | 0.019 | 0.020 | 0.020 | 0.019 |
| | (0.031) | (0.040) | (0.039) | (0.037) |
| *Observations (Groups)* | 160 (80) | 152 (76) | 160 (80) | 164 (82) |
| Overweight (bmi>=25) | -0.094 | -0.082 | -0.078 | -0.094 |
| | (0.072) | (0.077) | (0.077) | (0.076) |
| *Observations (Groups)* | 160 (80) | 152 (76) | 160 (80) | 164 (82) |
| Obese (bmi>=30) | -0.075 | -0.082 | -0.059 | -0.057 |
| | (0.059) | (0.056) | (0.059) | (0.057) |
| *Observations (Groups)* | 160 (80) | 152 (76) | 160 (80) | 164 (82) |
| *Exercise* | | | | |
| Vigorous Physical Activity | -1.357 | -1.309 | -1.604* | -1.426* |
| | (0.816) | (0.879) | (0.849) | (0.848) |
| *Observations (Groups)* | 166 (83) | 158 (79) | 166 (83) | 168 (84) |
| Moderate Physical Activity | -0.031 | 0.172 | 0.080 | 0.278 |
| | (0.743) | (0.847) | (0.791) | (0.794) |
| *Observations (Groups)* | 166 (83) | 158 (79) | 166 (83) | 168 (84) |
| *Marijuana Use* | | | | |
| Marijuana Use | 0.036 | 0.020 | 0.019 | 0.000 |
| | (0.030) | (0.035) | (0.026) | (0.030) |
| *Observations (Groups)* | 166 (83) | 160 (80) | 166 (83) | 170 (85) |
| *Preventive Care* | | | | |
| Vitamin Take | 0.057 | 0.059 | 0.058 | 0.074 |
| | (0.101) | (0.103) | (0.103) | (0.101) |
| *Observations (Groups)* | 160 (80) | 158 (79) | 164 (82) | 168 (84) |
| Blood Pressure Test | -0.097 | -0.123* | -0.153** | -0.148** |
| | (0.063) | (0.068) | (0.065) | (0.063) |
| *Observations (Groups)* | 184 (92) | 178 (89) | 184 (92) | 188 (94) |
| Doctor Visit | -0.109 | -0.100 | -0.078 | -0.075 |
| | (0.073) | (0.081) | (0.079) | (0.076) |
| *Observations (Groups)* | 162 (81) | 152 (76) | 158 (79) | 162 (81) |
| *Health Behavior* | | | | |
| Work hard to stay healthy | -0.154 | -0.163 | 0.020 | -0.000 |
| | (0.239) | (0.250) | (0.227) | (0.220) |
| *Observations (Groups)* | 148 (74) | 144 (72) | 146 (73) | 150 (75) |
| Effort on health | -0.304 | -0.038 | -0.315 | -0.286 |
| | (0.371) | (0.386) | (0.383) | (0.373) |
| *Observations (Groups)* | 168 (84) | 162 (81) | 170 (85) | 174 (87) |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are in parentheses.

Table 10: Effects of teenage childbearing on health-Different Age

| | Within-family | | | | | |
|---|---|---|---|---|---|---|
| | Teen Mother<20 years | | Teen Mother<19 years | | Age at first birth | |
| | (1) Siblings | (2) Twins | (3) Siblings | (4) Twins | (5) Siblings | (6) Twins |
| Self Reported Health | -0.171 | -0.203 | -0.049 | -0.091 | 0.024 | -0.014 |
| | (0.218) | (0.308) | (0.262) | (0.398) | (0.032) | (0.048) |
| # of Chronic Conditions | -0.468 | -0.533 | -0.441 | -0.098 | 0.012 | 0.082 |
| | (0.327) | (0.403) | (0.395) | (0.493) | (0.049) | (0.062) |
| Chronic Condition | -0.031 | -0.033 | -0.049 | -0.024 | 0.006 | 0.015 |
| | (0.045) | (0.065) | (0.054) | (0.078) | (0.007) | (0.010) |
| Physical Health | -0.025 | -0.030 | -0.026 | -0.024 | 0.003 | 0.002 |
| | (0.036) | (0.048) | (0.044) | (0.060) | (0.005) | (0.008) |
| Mental Health | -0.044 | -0.075 | -0.059 | -0.023 | 0.005 | 0.009 |
| | (0.048) | (0.060) | (0.058) | (0.076) | (0.007) | (0.010) |
| Self Evaluated Health | 0.042 | 0.121 | 0.105 | -0.023 | -0.009 | -0.018 |
| | (0.109) | (0.147) | (0.133) | (0.183) | (0.016) | (0.023) |
| Ever Had Cancer | 0.058 | 0.060 | 0.059 | 0.023 | -0.010* | -0.008 |
| | (0.036) | (0.040) | (0.044) | (0.050) | (0.005) | (0.006) |
| Controls | | | | | | |
| Age | Yes | - | Yes | - | Yes | - |
| Race | - | - | - | - | - | - |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are in parentheses.

Table 11: Effects of teenage childbearing on health behaviors-Different Age

| | Within-family | | | | | |
|---|---|---|---|---|---|---|
| | Teen Mother<20 years | | Teen Mother<19 years | | Age at first birth | |
| | (1) Siblings | (2) Twins | (3) Siblings | (4) Twins | (5) Siblings | (6) Twins |
| *Smoking* | | | | | | |
| Current Smoker | -0.013 | -0.015 | -0.016 | -0.047 | 0.007 | 0.008 |
| | (0.051) | (0.059) | (0.062) | (0.087) | (0.008) | (0.011) |
| Ever Smoker | -0.055 | -0.000 | -0.038 | -0.029 | 0.010 | -0.002 |
| | (0.053) | (0.067) | (0.074) | (0.095) | (0.008) | (0.011) |
| Starting Age Smoking | -1.644** | -1.360 | -1.770* | -0.706 | 0.228** | 0.324* |
| | (0.838) | (1.084) | (0.959) | (1.334) | (0.113) | (0.166) |
| *Diet* | | | | | | |
| BMI | 0.439 | 0.424 | 0.616 | 0.786 | -0.060 | -0.079 |
| | (0.609) | (0.771) | (0.728) | (0.946) | (0.090) | (0.118) |
| Underweight (bmi<=18.5) | 0.002 | 0.018 | 0.040 | 0.054 | -0.002 | -0.002 |
| | (0.022) | (0.035) | (0.026) | (0.043) | (0.003) | (0.005) |
| Overweight (bmi>=25) | -0.002 | -0.089 | -0.020 | -0.162* | -0.000 | 0.014 |
| | (0.056) | (0.072) | (0.067) | (0.087) | (0.008) | (0.011) |
| Obese (bmi>=30) | -0.034 | -0.071 | 0.014 | 0.027 | 0.003 | 0.013 |
| | (0.046) | (0.056) | (0.055) | (0.069) | (0.007) | (0.008) |
| *Exercise* | | | | | | |
| Vigorous Physical Activity | -0.807 | -1.319* | -0.327 | -1.218 | 0.057 | 0.067 |
| | (0.563) | (0.782) | (0.685) | (0.983) | (0.084) | (0.124) |
| Moderate Physical Activity | -0.909 | 0.194 | -1.031 | -0.301 | 0.112 | 0.018 |
| | (0.558) | (0.750) | (0.674) | (0.914) | (0.082) | (0.115) |
| *Marijuana Use* | | | | | | |
| Marijuana Use | 0.016 | 0.017 | 0.038 | 0.026 | -0.005 | -0.005 |
| | (0.022) | (0.031) | (0.026) | (0.038) | (0.003) | (0.005) |
| *Preventive Care* | | | | | | |
| Vitamin Take | 0.063 | 0.054 | 0.079 | 0.156 | -0.007 | -0.012 |
| | (0.066) | (0.100) | (0.091) | (0.128) | (0.010) | (0.015) |
| Blood Pressure Test | -0.096** | -0.123** | -0.143* | -0.176* | 0.011* | 0.019* |
| | (0.043) | (0.061) | (0.063) | (0.088) | (0.006) | (0.010) |
| Doctor Visit | -0.035 | -0.088 | -0.036 | -0.079 | 0.004 | 0.016 |
| | (0.050) | (0.074) | (0.061) | (0.091) | (0.007) | (0.011) |
| *Health Behavior* | | | | | | |
| Work hard to stay healthy | 0.074 | -0.109 | 0.092 | -0.161 | 0.007 | 0.017 |
| | (0.184) | (0.227) | (0.256) | (0.311) | (0.029) | (0.037) |
| Effort on health | -0.145 | -0.288 | -0.481 | -0.675 | 0.008 | 0.031 |
| | (0.260) | (0.362) | (0.310) | (0.436) | (0.038) | (0.056) |
| Controls | | | | | | |
| Age | Yes | - | Yes | - | Yes | - |
| Race | - | - | - | - | - | - |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are in parentheses.

Table 12: Effects on exercise and preventive care after controlling for possible mechanisms

| | Main Results | | Education | | Number of children | | Married | | Spouse Education | |
|---|---|---|---|---|---|---|---|---|---|---|
| | (1) Siblings | (2) Twins | (3) Siblings | (4) Twins | (5) Siblings | (6) Twins | (7) Siblings | (8) Twins | (9) Siblings | (10) Twins |
| Vigorous Physical Activity | -0.807 | -1.319* | -0.712 | -1.215 | -0.853 | -1.398* | -0.834 | -1.357 | -0.726 | -2.536* |
| | (0.563) | (0.782) | (0.590) | (0.841) | (0.576) | (0.811) | (0.569) | (0.818) | (0.900) | (1.269) |
| *Observations (Groups)* | 327 (151) | 178 (89) | 327 (151) | 178 (89) | 327 (151) | 178 (89) | 327 (151) | 178 (89) | 236 (142) | 133 (84) |
| Vigorous Physical Activity | -3.183*** | -3.231** | -3.031*** | -2.954** | -3.149*** | -3.232** | -3.198*** | -3.259*** | -5.441*** | -5.991*** |
| (Age<=45) | (1.066) | (1.229) | (1.061) | (1.286) | (1.090) | (1.263) | (1.000) | (1.083) | (1.593) | (1.928) |
| *Observations (Groups)* | 113 (62) | 76 (38) | 113 (62) | 76 (38) | 113 (62) | 76 (38) | 113 (62) | 76 (38) | 80 (53) | 56 (37) |
| Blood Pressure Test | -0.096** | -0.123** | -0.091** | -0.118* | -0.087** | -0.128** | -0.092** | -0.116* | -0.150*** | -0.171* |
| | (0.043) | (0.061) | (0.045) | (0.068) | (0.044) | (0.063) | (0.043) | (0.062) | (0.057) | (0.091) |
| *Observations (Groups)* | 348 (161) | 198 (99) | 348 (161) | 198 (99) | 348 (161) | 198 (99) | 348 (161) | 198 (99) | 251 (151) | 147 (93) |
| Controls | | | | | | | | | | |
| Age | Yes | - | Yes | - | Yes | - | Yes | - | Yes | - |
| Education | No | No | Yes | Yes | No | No | No | No | No | No |
| Number of Children | No | No | No | No | Yes | Yes | No | No | No | No |
| Married | No | No | No | No | No | No | Yes | Yes | No | No |
| Spouse Education | No | No | No | No | No | No | No | No | Yes | Yes |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are in parentheses.

Table 13: Sample Means (standard deviations) for possible mechanisms

| | Within-family (Identifying Samples) | | | |
|---|---|---|---|---|
| | Siblings | | Twins | |
| | (1) Teen Mothers | (2) Nonteen Mothers | (3) Teen Mothers | (4) Nonteen Mothers |
| High school graduate | 0.70 | 0.85 | 0.64 | 0.84 |
| | (0.46) | (0.36) | (0.48) | (0.37) |
| Number of children | 2.91 | 2.63 | 2.84 | 2.49 |
| | (1.42) | (1.32) | (1.42) | (1.17) |
| Married | 0.66 | 0.70 | 0.67 | 0.75 |
| | (0.47) | (0.46) | (0.47) | (0.44) |
| Spouse more than high school | 0.37 | 0.54 | 0.40 | 0.51 |
| | (0.49) | (0.50) | (0.49) | (0.50) |
| Observations | 107 | 121 | 67 | 67 |

The "within-family" samples consist of sisters who differ in the timing of their first births (teen mother vs nonteen mother).

## Appendix

Table A1. Equality tests for the effects of teenage childbearing on health

| | Siblings | | | Twins | | |
|---|---|---|---|---|---|---|
| | Cross-Section | Within-family | Equality Test | Cross-Section | Within-family | Equality Test |
| Self Reported Health | -0.530*** | -0.171 | p= 0.0325 | -0.596*** | -0.203 | p= 0.1140 |
| | (0.147) | (0.218) | | (0.200) | (0.308) | |
| *Observations (Groups)* | 890 | 328 (152) | | 462 | 182 (91) | |
| # of Chronic Conditions | 0.579*** | -0.468 | p= 0.0007 | 0.704** | -0.533 | p= 0.0061 |
| | (0.254) | (0.327) | | (0.355) | (0.403) | |
| *Observations (Groups)* | 901 | 333 (154) | | 468 | 184 (92) | |
| Chronic Condition | 0.023 | -0.031 | p= 0.1740 | 0.017 | -0.033 | p= 0.3812 |
| | (0.032) | (0.045) | | (0.044) | (0.065) | |
| *Observations (Groups)* | 901 | 333 (154) | | 468 | 184 (92) | |
| Physical Health | -0.105*** | -0.025 | p= 0.0163 | -0.078** | -0.030 | p= 0.2973 |
| | (0.025) | (0.036) | | (0.035) | (0.048) | |
| *Observations (Groups)* | 952 | 354 (163) | | 516 | 202 (101) | |
| Mental Health | -0.093*** | -0.044 | p= 0.2972 | -0.098** | -0.075 | p= 0.6878 |
| | (0.032) | (0.035) | | (0.042) | (0.060) | |
| *Observations (Groups)* | 956 | 356 (164) | | 520 | 204 (102) | |
| Self Evaluated Health | 0.321*** | 0.042 | p= 0.0023 | 0.225** | 0.121 | p= 0.3900 |
| | (0.073) | (0.109) | | (0.097) | (0.147) | |
| *Observations (Groups)* | 936 | 352 (162) | | 506 | 200 (100) | |
| Ever Had Cancer | 0.052** | 0.058 | p= 0.8959 | 0.057 | 0.060 | p= 0.9470 |
| | (0.026) | (0.036) | | (0.035) | (0.040) | |
| *Observations (Groups)* | 956 | 356 (164) | | 520 | 204 (102) | |
| Overall Index | 0.613*** | 0.065 | p= 0.0007 | 0.592*** | 0.166 | p= 0.0520 |
| | (0.137) | (0.178) | | (0.162) | (0.221) | |
| *Observations (Groups)* | 956 | 356 (164) | | 520 | 204 (102) | |
| Controls | | | | | | |
| Age | Yes | Yes | | Yes | - | |
| Race | Yes | - | | Yes | - | |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors (reported in parentheses) are adjusted for clustering within families in the "cross-section" regressions. p-values of $\chi^2$ test are reported.

Table A2. Equality tests for the effects of teenage childbearing on health behaviors

| | Siblings | | | Twins | | |
|---|---|---|---|---|---|---|
| | Cross-Section | Within-family | Equality Test | Cross-Section | Within-family | Equality Test |
| *Smoking* | | | | | | |
| Current Smoker | 0.161*** | -0.013 | p= 0.0001 | 0.182*** | -0.015 | p= 0.0022 |
| | (0.037) | (0.051) | | (0.050) | (0.059) | |
| *Observations (Groups)* | 954 | 352 (163) | | 518 | 202 (101) | |
| Ever Smoker | 0.127*** | -0.055 | p= 0.0002 | 0.197*** | -0.000 | p= 0.0027 |
| | (0.041) | (0.053) | | (0.053) | (0.067) | |
| *Observations (Groups)* | 954 | 352 (163) | | 518 | 202 (101) | |
| Starting Age Smoking | -0.915 | -1.644** | p= 0.3566 | -0.493 | -1.360 | p= 0.3342 |
| | (0.588) | (0.838) | | (0.734) | (1.084) | |
| *Observations (Groups)* | 312 | 138 (68) | | 174 | 86 (43) | |
| *Diet* | | | | | | |
| BMI | 1.671*** | 0.439 | p= 0.0397 | 1.956*** | 0.424 | p= 0.0474 |
| | (0.526) | (0.609) | | (0.732) | (0.771) | |
| *Observations (Groups)* | 844 | 313 (145) | | 426 | 172 (86) | |
| Underweight (bmi<=18.5) | 0.015 | 0.002 | p= 0.4651 | 0.029 | 0.018 | p= 0.6791 |
| | (0.014) | (0.022) | | (0.022) | (0.035) | |
| *Observations (Groups)* | 844 | 313 (145) | | 426 | 172 (86) | |
| Overweight (bmi>=25) | 0.091** | -0.002 | p= 0.0802 | 0.098* | -0.089 | p= 0.0110 |
| | (0.044) | (0.056) | | (0.053) | (0.072) | |
| *Observations (Groups)* | 844 | 313 (145) | | 426 | 172 (86) | |
| Obese (bmi>=30) | 0.099*** | -0.034 | p= 0.0040 | 0.079 | -0.071 | p= 0.0141 |
| | (0.038) | (0.046) | | (0.050) | (0.056) | |
| *Observations (Groups)* | 844 | 313 (145) | | 426 | 172 (86) | |
| *Exercise* | | | | | | |
| Vigorous Physical Activity | -0.760** | -0.807 | p= 0.9210 | -0.209 | -1.319* | p= 0.0818 |
| | (0.381) | (0.563) | | (0.533) | (0.782) | |
| *Observations (Groups)* | 889 | 327 (151) | | 458 | 118 (59) | |
| Moderate Physical Activity | -1.392*** | -0.909 | p= 0.3266 | -0.858* | 0.194 | p= 0.0692 |
| | (0.397) | (0.558) | | (0.515) | (0.750) | |
| *Observations (Groups)* | 892 | 326 (151) | | 462 | 178 (89) | |
| *Marijuana Use* | | | | | | |
| Marijuana Use | 0.030* | 0.016 | p= 0.4552 | 0.015 | 0.017 | p= 0.9103 |
| | (0.017) | (0.022) | | (0.019) | (0.031) | |
| *Observations (Groups)* | 894 | 327 (151) | | 464 | 180 (90) | |
| *Preventive Care* | | | | | | |
| Vitamin Take | 0.004 | 0.063 | p= 0.2508 | 0.012 | 0.054 | p= 0.5893 |
| | (0.039) | (0.066) | | (0.051) | (0.100) | |
| *Observations (Groups)* | 887 | 323 (149) | | 454 | 174 (87) | |
| Blood Pressure Test | -0.028 | -0.096** | p= 0.0941 | -0.038 | -0.123** | p= 0.0993 |
| | (0.032) | (0.043) | | (0.040) | (0.061) | |
| *Observations (Groups)* | 939 | 348 (161) | | 506 | 198 (99) | |
| Doctor Visit | -0.073*** | -0.035 | p= 0.2741 | -0.087** | -0.088 | p= 0.9955 |
| | (0.028) | (0.050) | | (0.040) | (0.074) | |
| *Observations (Groups)* | 883 | 322 (149) | | 452 | 172 (86) | |
| *Health Behavior* | | | | | | |
| Work hard to stay healthy | 0.209* | 0.074 | p= 0.3934 | 0.083 | -0.109 | p= 0.3602 |
| | (0.115) | (0.184) | | (0.153) | (0.227) | |
| *Observations (Groups)* | 851 | 306 (141) | | 432 | 160 (80) | |
| Effort on health | -0.102 | -0.145 | p= 0.8511 | -0.186 | -0.288 | p= 0.7378 |
| | (0.173) | (0.260) | | (0.234) | (0.362) | |
| *Observations (Groups)* | 890 | 329 (152) | | 460 | 182 (91) | |
| Overall Index | 0.559*** | 0.119 | p=0.0028 | 0.574*** | 0.114 | p= 0.0247 |
| | (0.120) | (0.167) | | (0.168) | (0.224) | |
| *Observations (Groups)* | 954 | 352 (163) | | 518 | 202 (101) | |
| Controls | | | | | | |
| Age | Yes | Yes | | Yes | - | |
| Race | Yes | - | | Yes | - | |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors (reported in parentheses) are adjusted for clustering within families in the "cross-section" regressions. p-values of $\chi^2$ test are reported.