Published in final edited form as:

Matern Child Health J. 2010 January ; 14(1): 36–46. doi:10.1007/s10995-008-0424-3.

Mental Illness as a Risk Factor for Uninsurance Among Mothers of Infants

Kelly Noonan¹, Anne Carroll², Nancy E. Reichman³, and Hope Corman¹

Kelly Noonan: knoonan@rider.edu; Anne Carroll: carroll@rider.edu; Nancy E. Reichman: reichmne@umdnj.edu; Hope Corman: corman@rider.edu

¹ Rider University and National Bureau of Economic Research, Department of Economics, Rider University, 2083 Lawrence Road, Lawrenceville, NJ 08648, USA

² Department of Finance, Rider University, 2083 Lawrence Road, Lawrenceville, NJ 08648, USA

³ Department of Pediatrics, Robert Wood Johnson Medical School, University of Medicine and Dentistry of New Jersey, 97 Paterson St., Room 435, New Brunswick, NJ 08903, USA

Abstract

The objective of this study was to assess the extent to which maternal prenatal mental illness is associated with mothers' health insurance status 12–18 months after giving birth. The sample consisted of 2,956 urban, mostly unwed, mothers who gave birth in 20 large U.S. cities between 1998 and 2000 and participated in the Fragile Families and Child Wellbeing birth cohort study. Multinomial logistic regression models were used to assess associations between maternal prenatal mental illness and whether the mother had private, public, or no insurance one year after the birth. Covariates included the mother's and child's physical health status, the father's physical and mental health status, and numerous other maternal, paternal, and family characteristics. Potential mediating factors were explored. The results showed that mothers with prenatal diagnosed mental illness were almost half as likely as those without mental illness diagnoses to have private insurance (vs. no insurance) one year after the birth. Among mothers who did not have a subsequent pregnancy, those with prenatal mental illness were less likely than those without mental illness diagnoses to have public insurance than to be uninsured. Screening positive for depression or anxiety at one year decreased the likelihood that the mother had either type of insurance. Policies to improve private mental health care coverage and public mental health services among mothers with young children may yield both private and social benefits. Encounters with the health care and social service systems experienced by pregnant and postpartum women present opportunities for connecting mothers to needed mental health services and facilitating their maintenance of health insurance.

Keywords

Health insurance; Mental illness; Maternal health; Infant health; Medicaid

Virtually all women in the United States have health insurance when their children are born. However, many lose coverage shortly thereafter. For example, in the recent Fragile Families and Child Wellbeing birth cohort survey of urban (mostly unmarried) parents, only 1% of births were not covered by public or private health insurance. This high rate of coverage for perinatal services is a direct result of Medicaid eligibility expansions for pregnant women that began in

the late 1980s. One year after they gave birth, however, over one quarter of the Fragile Families mothers were uninsured for health care.

Maintaining health insurance coverage can be challenging, particularly for low-income mothers. Public insurance is generally available through three mechanisms: being poor enough to qualify for welfare, being sufficiently disabled to qualify for Supplemental Security Income (SSI), or being pregnant (and meeting income criteria). Low-income mothers have limited access to employer-sponsored health insurance (the usual source of private health insurance in the U.S.), because they often work part-time, in low-paying jobs, or not at all. Those who are unmarried may have limited ability to obtain private coverage through a partner. These constraints have implications for mothers' health, as a large literature indicates that individuals with health insurance have better access to care, are more likely to get needed care, and have better health outcomes than those without insurance [1–9].

Having a physical or mental illness may make it difficult for mothers of newborns to face the economic, logistical, physical, and emotional challenges of meeting both their own needs and those of their children. For low-income mothers, those challenges may be particularly acute in the post-welfare reform era, as cash assistance—an important route to public health insurance coverage—is now time-limited in most states and work is often required as a condition for receiving cash benefits. While most young adults are physically healthy, mental illness is not rare. Mothers of young children have high rates of depressive symptoms, with 19% reporting two or more symptoms [10]. Low-income populations and unmarried parents are at disproportionate risk for mental illness [11–14]. Untreated maternal mental illness can have adverse effects on children's health and development, as it is associated with suboptimal parenting quality [15–17].

Individuals reporting mental disorders are more likely than those not reporting mental disorders to have problems maintaining health insurance [18]. There is evidence that mental illness is associated with lower take-up rates [19] and increased loss of private insurance coverage [20]. In contrast, days of depression appear to have a positive association with public health insurance coverage [21]. That mental illness may affect public and private insurance status differently is not surprising, as disability is a potential path to eligibility for public health insurance and mental illness might qualify as a disability. In contrast, private insurance markets, particularly individual (as opposed to group) markets, may limit access to individuals with pre-existing conditions, including mental illness [22].

Health insurance coverage has been found to increase access to mental health care [23] and can be a valuable financial resource, particularly for low income families. It is thus vitally important for their own and their children's sake that mothers with mental illness have health insurance. In this study, we use population-based data to examine the effects of mental illness on health insurance status among urban, mostly unmarried mothers with one-year-old children who participated in a national birth cohort study in the post-welfare reform era. Using a measure of diagnosed mental illness that predates the birth, we examine the extent to which mental illness is associated with mothers' health insurance status approximately one year postpartum, controlling for a rich array of factors. The health measures are drawn primarily from medical records, reducing the potential for measurement error that may characterize self-reported measures. We also explore several potential mediating factors that are measured when the child was 12–18 months old, including a measure of maternal mental illness based on a standardized screening instrument for depression or anxiety.

Methods

This analysis is based on data from the Fragile Families and Child Wellbeing (FFCWB) study, which is an ongoing longitudinal birth cohort study. Here, we briefly describe the research design, which is described elsewhere in detail [24]. From 1998 to 2000, parents were interviewed in 75 hospitals in 20 U.S. cities (in 15 states) shortly after their children were born. Cities were selected from all 77 U.S. cities with over 200,000 people using a stratified random sample. In 18 of the cities, all birth hospitals within the city boundaries were included. In the two largest cities, hospitals were randomly sampled. Within each hospital, births were randomly sampled from birth logs, with an oversample of non-marital births because the study was designed to provide information about the conditions and capabilities of new (mostly unwed) parents, as well as the nature, determinants, and trajectories of their relationships.

While still in the hospital after giving birth, mothers were approached by a professional survey interviewer and screened for eligibility. Mothers were eligible for the study if they and the infant's father were at least 18 years old (this restriction did not apply in approximately one-third of the hospitals, where parents under age 18 were also allowed to participate), if they were able to complete the interview in either English or Spanish, if the father of the newborn was living, and if they were not planning to place the child for adoption. If they were eligible, mothers were asked to participate in a national survey about the conditions and capabilities of new parents, their relationships, and their children's well-being.

Interviews were conducted with 4,898 mothers while they were still in the hospital after giving birth. The infants' fathers were also interviewed, shortly thereafter in the hospital or at another location. Response rates were 86% among eligible mothers and 78% among eligible fathers (fathers were eligible if the infant's mother completed an interview). Follow-up interviews were conducted over the telephone with mothers when the child was one-year old; 89% of the mothers who completed baseline (postpartum) interviews were re-interviewed when their children were between 12 and 18 months old.

Additional data have been collected from the hospital medical records (from the birth) for a sub-sample of 3,684 births that included births from all 20 cities. Permission to collect the medical record data in large part reflected administrative procedures for obtaining approval at the different hospitals rather than decisions on the part of individual respondents to have their records reviewed. Measures of census tract-level poverty were linked to the data using the mothers' addresses at the time of the birth.

Study Sample

Of the 3,684 mothers with medical record data, 394 (10.7%) did not complete follow-up interviews. Of the remaining 3,290 mothers, 46 were excluded from the analyses because they did not have health insurance at the time of the birth, 4 were excluded because they had both private and public insurance at the one-year follow-up interview, and 284 were excluded because of missing data on one or more covariates. The analysis sample, which consisted of the remaining 2,956 mothers, did not differ significantly from the 1,942 cases not in the analysis sample in terms of race, ethnicity, marital status, parity, age, nativity, or employment status.

Study Variables

The key dependent variable is the current health insurance status reported by the mother at the follow-up interview. At that time, the mother was asked if she was covered by Medicaid or received health insurance from another public, federal, or state assistance program. She was also asked if she was covered by private health insurance. This information was used to classify mothers as having public insurance, private insurance, or no insurance at follow-up.

The other analysis variables are classified as “mother’s prenatal health,” “mother’s other characteristics,” “family characteristics,” and “follow-up characteristics.” Except for the last set, all were measured at baseline—that is, from the postpartum interviews or medical records (from the birth hospitalization). The mother’s prenatal health variables include measures of both mental and physical health. Whereas in most population-based studies, mental and physical health are ascertained through survey questions, our measures were constructed from the mothers’ prenatal medical records. The mother was coded as having a pre-existing mental illness if there was any documentation of a diagnosed DSM-IV mental disorder (e.g., depression, anxiety, bipolar disorder, schizophrenia, anorexia, suicidality, and mental retardation) in her chart. For physical health, the mother was coded as having a pre-existing physical health condition if she had one or more health conditions (including lung disease, cardiac disease, chronic diabetes, hypertension, and liver disease) documented in her medical history.

The mother’s other characteristics represent demographic and socioeconomic factors that are associated with health insurance status and may also be associated with mental illness. These include age (in years), education (high-school graduate vs. less than high school), race/ethnicity (Hispanic and non-Hispanic black vs. other), nativity (foreign-born vs. US-born), employed at all during the two-year period prior to the birth (vs. not employed during that period), type of health insurance for the birth (private vs. public insurance; based on the same question that was asked at follow-up), the percentage of households in the mother’s baseline census tract that had income under the poverty line, relationship status (married and cohabiting, compared to neither married nor cohabiting), whether the birth of the focal child was the mother’s first birth, and whether the birth was a multiple (vs. single) birth.

The family characteristics include paternal military service (ever), whether the father was employed at baseline, and whether the father’s baseline employer offered health insurance. In addition, based on past research demonstrating interdependencies between family members’ health and insurance status [25], we include measures of the child’s and father’s health status. The measure of child health is whether the infant had a severe or moderately severe abnormal health condition at birth. The coding was conducted by an outside pediatric consultant who systematically reviewed the medical record data on infant conditions, as well as maternal reports from the follow-up interviews on physical disabilities of the child. The measures of physical and mental health status of the father are the father’s self-reported health status (good, fair, or poor, compared to excellent or very good) at baseline and his score from a short version of the Center for Epidemiologic Studies Depression Scale (CES-D), which was included in the fathers’ baseline interview. Because all items in the standard CES-D were not asked in the father baseline survey, we followed Mirowsky and Ross [26] and used an abbreviated scale based on the following questions: On how many days in the past week did you: (1) feel that you could not shake off the blues even with help from your friends, (2) have trouble keeping your mind on what you were doing, (3) feel that everything was an effort, (4) sleep restlessly, (5) feel lonely, (6) feel sad, and (7) feel you could not get going. We calculated the mean response to those seven items, which ranged from 0 (low risk for depression) to 7 (high risk for depression). To avoid sample loss due to missing data, fathers who did not complete the baseline interview were assigned the mean CES-D score and a zero value for suboptimal health. A dummy variable indicating that the father did not complete a baseline interview was included in the multivariate analyses.

The mothers’ follow-up characteristics include measures of maternal health (mental and physical) from the mother’s follow-up survey. Mental illness is measured using a dichotomous indicator for whether the mother met the diagnostic criteria for major depression or generalized anxiety in the past 12 months according to the Composite International Diagnostic Interview Short Form (CIDI-SF) Version 1.0 November 1998 [27] which was embedded in the mother’s

follow-up interview. The scoring followed the procedures outlined by the developers of the CIDI-SF [28]. Maternal physical health at follow-up is measured using mothers' self-reported health status (good, fair, or poor, compared to excellent or very good) and whether she had a disability that limited her ability to engage in paid employment.

Additional maternal follow-up characteristics include whether the mother got married or re-married (to the baby's father or to someone else) between her baseline and follow-up interviews, whether she was currently working at the time of her follow-up interview, and whether she became pregnant again between her baseline and follow-up interviews.

Statistical Analyses

Stata/SE version 10.0 software (StataCorp LP, College Station, Texas) was used to conduct all statistical analyses. Characteristics of the sample were examined by mothers' insurance status at the follow-up. χ^2 tests for categorical variables and *F*-tests for continuous variables were conducted to identify significant differences in characteristics by insurance status.

Multinomial logistic regression analysis was used to estimate the associations between maternal/family characteristics and health insurance status. Relative risk ratios (RRRs) and confidence intervals (CIs) are presented for two different models, a basic model which included maternal prenatal health (diagnosed mental illness and physical health condition), mother's other characteristics, and family characteristics, and an augmented model which included all of the variables in the basic model, plus mother's follow-up characteristics, which represent potential mediators. Both models also include indicators for the mother's state of residence at the time of the baseline interview (to control for differences across states in insurance markets, labor markets, and policy environments that may affect both mental illness and mothers' health insurance status) and the number of months between the mother's baseline and follow-up interviews (to control for the duration of time the mother was exposed to the possibility of a change in insurance status). In terms of the latter, though the follow-up interviews were intended to take place as close as possible to the child's first birthday, in actuality they took place somewhat later than that (about 3–4 months later, on average). Thus, the one year follow-up generally took place when the child was 12–18 months old. Supplementary models were run to assess sensitivity of the findings and explore interactive effects.

Results

Over one-third (39%) of mothers were covered by public insurance, about one-third (33%) were covered by private insurance, and the other 28% had no insurance at the time of the one-year follow-up interview (Table 1). Results from the χ^2 and *F*-tests indicate that all characteristics other than multiple birth, child health status, and percent below poverty in the census tract differed significantly across the insurance groups (at $P < .05$).

While maternal mental and physical health conditions that predate the birth vary by insurance status at follow-up, the difference is most striking for mental illness. Twice as many mothers with public insurance have a history of diagnosed mental illness (14%) as do those with private insurance (7%).

Foreign-born mothers, who account for about 15% of the sample, comprise a sizable fraction of the uninsured (24%) and much smaller shares of the privately (14%) and publicly (9%) insured. The percentage of households in the mother's census tract with income under the poverty line is lowest in the privately insured group (13% for the privately insured group compared to 24% for the publicly insured group and 20% for the uninsured group). First births are more common among privately insured than among publicly insured and uninsured mothers.

Among mothers with public insurance at follow-up, 93% were unmarried at the time of the birth and about 40% of those who were unmarried lived with the child's father. Among mothers with private insurance at follow-up, half (51%) were unmarried when the child was born and 57% of those who were unmarried lived with the child's father. About 15% of mothers with no insurance were married and over half (55%) of the unmarried mothers with no insurance resided with the child's father at the time of the birth.

One-fifth of the children in the sample were coded as having been diagnosed with a health condition (20% of the publicly insured group, 19% of the privately insured group). The prevalence of self-reported suboptimal health status and the mean depression scores were higher for fathers in the "mothers with public insurance" and "mothers are uninsured" groups than for those in the "mothers with private insurance" group.

The fathers associated with mothers in the public and uninsured groups were less likely than those associated with mothers in the private insurance group to have served in the military, to have been employed, and to have received health insurance through an employer. Other than for employment, the associations are quite large. For 13% of the mothers who were privately insured at follow-up, the father had served in the military; the corresponding figures for publicly insured and uninsured mothers were 6% and 8%, respectively. For two-thirds (64%) of mothers with private insurance at follow-up, the father had insurance through an employer at the time of the birth; the corresponding figures for mothers with public and no insurance at follow-up were 31% and 35%, respectively.

Both mental and physical health status at follow-up differed by insurance status. Maternal depression or anxiety after the birth of the child (this could include postpartum depression) was much more prevalent among mothers who were covered by public insurance (15%) or uninsured (17%) than among mothers with private insurance (9%). Similarly, mothers who reported poor physical health at the follow-up were more likely to have public insurance (41%) or to be uninsured (46%) than to have private insurance (29%). Mothers who reported in the follow-up interview that they had a disability that limits their ability to work were more likely to have public insurance coverage than to have private or no insurance. Mothers with public insurance at follow-up were the least likely to have gotten married, the least likely to be employed, and the most likely to have had a subsequent pregnancy between the baseline and follow-up interviews.

When controlling for prenatal physical health status and other baseline covariates in the basic model (Table 2), mothers with a prenatal history of mental illness were half as likely as those without a history of mental illness to have private insurance coverage (vs. no insurance) at follow-up (RRR = .51), but prenatal mental illness was not significantly associated with having public versus no insurance.

Mothers who were high school graduates and those with private insurance at baseline were more likely than those with less than a high school education and those without private insurance at baseline to have private insurance at follow-up. In fact, mothers with private insurance at baseline were about six times more likely to have private insurance at follow-up than to be uninsured. The poorer the mother's census tract at the time of the birth, the less likely that she had private insurance and the more likely that she had public insurance 12–18 months later. If the birth was the mother's first, she was significantly less likely to have public insurance coverage than to have no insurance (RRR = .69). The parents having been married at the time of the birth more than doubled the probability that the mother had private insurance, and decreased the probability that she had public insurance, at follow-up. Finally, mothers who are foreign-born and who are Hispanic were significantly less likely than their native-born and non-Hispanic counterparts to have public or private insurance coverage at follow-up.

The health of the child at birth was not significantly associated with the mother's insurance status one year after the birth. However, the father's suboptimal physical health at the birth had a strong negative association with the mother's private insurance coverage one year later (RRR = .73). The father's CES-D depression score was associated with public, but not private, health insurance of the mother; the mother's likelihood of having public (vs. no) health insurance increased as the father's risk for depression increased. The father having had health insurance through an employer at baseline significantly increased the likelihood that the mother had private insurance at the time of the follow-up interview (RRR = 1.71).

The follow-up characteristics, which are potential mediating variables, are strongly associated with both private and public insurance in the expected directions (augmented model). However, there are some differences depending on whether the outcome is private or public insurance. Mothers who married between the two survey waves and those who were employed were far more likely than those who did not marry and were not employed to have private health insurance. Being disabled and becoming pregnant again, both of which are related to eligibility, nearly doubled the likelihood of public insurance. Working, which should reduce eligibility by increasing earnings, decreased the likelihood of public insurance by about 50%. Mothers who screened positive for depression and/or anxiety at follow-up were less likely than those without symptoms of depression or anxiety to have either kind of insurance at follow-up, controlling for prenatal mental illness and the other covariates and potential mediators.

It is clear from the above discussion that the mediating factors are strongly related to the mother's private health insurance status at follow-up. Including them in the model somewhat reduces the magnitude of the effect of prenatal mental illness on private insurance (RRR increases from 0.51 to 0.64), but that estimate remains statistically significant at the 5% level. The finding of no significant association between prenatal mental illness and public insurance coverage one year later is not sensitive to the inclusion of the follow-up measures.

We estimated auxiliary models with sample restrictions, different variable constructions, or alternative model specifications to further explore the findings and assess the sensitivity of the results (not shown in tables). Because pregnancy is an important route to eligibility for public insurance, we estimated the basic and augmented models for the subset of mothers who did not have a pregnancy between the baseline and follow-up interviews. For this restricted sample, the associations between prenatal mental illness and public (vs. no) coverage were negative and almost statistically significant in the basic model (RRR = .78, $P = .11$), and were of similar magnitude and statistically significant in the augmented model (RRR = .73, $P = .07$). Models that excluded fathers who did not complete baseline interviews (instead of using indicators for missing data) produced findings virtually identical to those in Table 2. The estimates were insensitive to recoding of the physical health variable to capture additional pre-existing conditions (which were rare) or using alternative measures of poor maternal physical health (e.g., number of pre-existing conditions or other subsets of conditions). Finally, unadjusted multinomial logistic regressions for each independent variable revealed, almost without exception, associations very similar to or larger than the corresponding multivariate estimates in the basic model of Table 2. For two of the follow-up (mediating) characteristics (got married and new pregnancy), the estimated effects were larger in the augmented multivariate model.

We also explored whether specific independent variables of interest modify the effects of prenatal mental illness (results not shown in tables). First, we estimated a variant of the augmented model that included the following instead of the prenatal and follow-up mental illness variables: prenatal mental illness but no mental health problem at follow-up, mental health problem at follow-up but no prenatal mental illness, and both prenatal mental illness and follow-up mental health problem. Having a mental health problem at either wave reduced the likelihood of having either private or public insurance. However, the effects were strongest

for women who had a mental health problem at both waves; those mothers were about 50 percent less likely to have public insurance ($RRR = .47$, $P < .001$) and 72 percent less likely to have private insurance ($RRR = .28$, $P < .01$) than to be uninsured at follow-up.

Second, we explored potential modifying effects of maternal baseline characteristics that are known barriers to health insurance and that were found to be significant factors in our analyses reported in Table 2—having less than a high school education, being foreign-born, having a Medicaid-financed birth, being unmarried, and living in a census tract with 25% or more of the families below the poverty line. For each characteristic, we estimated (basic) models as described above (i.e., including variables for mental illness but not having the characteristic, having the characteristic but not having mental illness, and having both mental illness and the characteristic). We found that for all characteristics other than being Hispanic, having the barrier compounded the adverse effects of mental illness (results not shown).

Discussion

We explored associations between prenatal diagnosed mental illness and health insurance status of urban mothers, most of whom gave birth out-of-wedlock, approximately one year after their children were born. We characterized prenatal mental illness as a single composite condition as is often done in population-based studies of physical health, recognizing that the aggregation of different conditions may mask variation by type of diagnosis.

We found that mental illness is strongly and negatively associated with private insurance coverage (compared to uninsurance) among mothers of young children. The association holds for measures of both prenatal and post-natal mental illness. One possible reason for this observed relationship is that the expected benefit to the mother of private coverage may fall after the birth of her child because mental health benefits have historically been less comprehensive than those for other conditions despite the 1996 Mental Health Parity Act [29,30]. In addition, it is possible that mental illness reduces mothers' access to employer-sponsored health insurance through the type of job she holds or her level of earnings, both of which we did not measure, or that mothers with mental illness tend to be in relationships with partners who have limited access to or willingness to provide private health insurance.

We did not find a significant association between pre-natal mental illness and public insurance in the sample overall, but we did find a significant negative association when the sample was restricted to mothers who did not have a subsequent pregnancy during the observation period. We also found that postnatal mental illness was negatively associated with public insurance (vs. no insurance). Mothers with mental illness may have impaired ability to navigate the often-difficult process of applying and re-applying for public health insurance. Indeed, young children of mothers with mental illness are less likely than those of mothers without mental illness to have public (vs. no) health insurance despite the fact that child eligibility is quite generous under the SCHIP program [25], suggesting that administrative hassles play a role. For example, the process of applying for Social Security Disability benefits can be onerous, as the applicant is expected to provide a considerable amount of documentation and program personnel may be reluctant to qualify individuals on the basis of mental disorders (the fact that only 4% of Medicaid beneficiaries receive coverage because a mental disorder qualifies them as disabled [31] provides some evidence that this may be the case).

We also found that mothers who are foreign-born and who are Hispanic were significantly less likely than their native-born and non-Hispanic counterparts to have public or private insurance coverage at follow-up. Members of these two groups may lack proficiency in English, and language barriers have been shown to be an obstacle to enrollment to public coverage [32]. Additionally, immigrants face strict eligibility requirements for Medicaid [33], and even those

who are eligible may not take up public coverage if they fear it will lead to inquiries into their and their family members' immigration status.

The findings have important policy implications. Without insurance, mothers with mental illness face a major obstacle to obtaining needed mental health services. Mothers with newborns are at particular risk for postpartum depression, and lack of coverage makes it more likely that the condition will not be treated, or possibly, even be diagnosed. Mental illness may prevent mothers from carrying out tasks that allow them to achieve or maintain self-sufficiency and to be effective parents. Favorable mental health status is positively associated with employment [34,35], productivity, and work attendance [36]. These outcomes may be especially important in the post welfare-reform era of work requirements and time-limited cash assistance. Mothers' mental health can also affect their children's health and development. Past research has found that mothers with depression have a difficult time managing their young children's medical care [37] and regular daily needs [16]. Similar issues with managing child health care and parenting practices may arise for mothers with other mental illnesses. Unfavorable parenting practices may lead to cognitive, social and emotional problems among children [38].

There are opportunities to address the coverage issue for mothers with mental illness. Since information on mothers' mental health history is often available in their medical records, the hospital of delivery would be a convenient checkpoint for educating mothers with diagnosed mental illnesses about the availability and importance of postnatal health insurance coverage for both themselves and their children, and for establishing a follow-up plan to ensure that they do not get lost in the system. That said, hospital stays for childbirth are often brief, so other connections with health and social service systems may be more effective checkpoints for assuring coverage. One opportunity for screening would be during the course of pediatric care. Increased training for pediatricians and family practitioners could provide much potential for improved treatment of women with depression [39,40]. In addition, making private mental health benefits more generous may both increase the value of coverage to those with mental illness and benefit employers as well. For example, there is evidence that, when diagnosed, depression can be treated in a cost effective manner and ultimately save employers money [41,42]. Another study found that more generous mental health benefits increase the probability that an employee will return to work from a disability spell due to mental illness [43]. Streamlining and simplifying the re-enrollment process for public coverage may make the task less overwhelming for eligible mothers who have mental illness and increase the likelihood they will maintain their coverage. Examples of specific state policies that could facilitate coverage include presumptive eligibility (immediate temporary coverage until eligibility is determined), reduction of the time period between eligibility redeterminations, and elimination of face-to-face interview requirements. Finally, our findings vis-à-vis Hispanics and immigrants suggest that addressing language and cultural barriers may increase health insurance coverage among Hispanic and immigrant mothers with young children, regardless of their mental illness status.

The results from this study are subject to certain limitations. It is possible that the observed associations between prenatal mental illness and mothers' postnatal health insurance status reflect pre-pregnancy health insurance status or other unobserved characteristics. Thus, prenatal mental illness should be considered a marker for, rather than a cause of, subsequent health insurance status. The prenatal mental illness measure includes only diagnosed conditions that were recorded in the mother's hospital medical record prior to the birth and does not permit disaggregation of different types of mental illness. Due to the timing of the administration of the CIDI-SF screener (the follow-up interview), it is not clear whether maternal anxiety or depression led to or followed observed changes in insurance status. Another limitation of using the CIDI-SF is that it cannot be used to assess mental illnesses other than depression and

anxiety. Finally, we were not able to explore underlying mechanisms by which mental illness may affect health insurance status or intervening outcomes. For example, past research has shown that certain types of mental illness are associated with impairments in executive functioning that impede the ability to plan [44] and may translate to not maintaining insurance. Regardless of cause and effect or mechanism, however, our results point to prenatal mental illness as a clear and identifiable risk factor for mothers losing health insurance soon after giving birth. Other limitations are that the study is based exclusively on urban, mostly non-marital births and that it captures a snapshot of health insurance coverage at one point in time, as opposed to the duration of time spent in each insurance status or the dynamics of changes in insurance status.

Conclusion

Although almost all women in the U.S. have health insurance when they give birth, many lose coverage when their children are very young. Maternal mental illness is an important predictor of loss of coverage. Having a prenatal diagnosed mental illness decreases the likelihood that the mother will have private health insurance when her child is 12–18 months old, and it decreases the likelihood that she will have public insurance if she has not become pregnant again. Screening positive for anxiety or depression when the child is 12–18 months old also decreases the likelihood that she has insurance (public or private) at that time. Lack of insurance among mothers with mental illness may have adverse consequences for both mothers and their children, as it represents a barrier to obtaining treatment and is associated with poor parenting. Health professionals, social service organizations, and policymakers should be aware of the obstacles that mothers with mental illness face in securing and maintaining insurance coverage. Health professionals and social service providers have many opportunities to interact with mothers who have diagnosed mental illness both before and after they give birth (for example, at pediatric care encounters, through food and nutrition programs, through home visiting programs, or through community organizations and schools) and can both encourage and facilitate their maintenance of health insurance coverage. The recent passage of the Emergency Economic Stabilization Act of 2008, which included mental health parity provisions that are much stronger than those in the 1996 Mental Health Parity Act, will expand private mental health benefits, which may make coverage more attractive and improve the likelihood that it will be maintained. Finally, policymakers should consider ways to simplify enrollment processes to reduce barriers to public insurance.

Acknowledgments

This research was supported by grants #R01-HD-45630 and #R01-HD-35301 from the National Institute of Child Health and Human Development.

References

1. Hadley J. Sicker and poorer: The consequences of being uninsured. *Medical Care Research and Review* 2002;60:3S–75S.10.1177/1077558703254101 [PubMed: 12800687]
2. Kasper JD, Giovanni TA, Hoffman C. Gaining and losing health insurance: Strengthening the evidence on access to care and health outcomes. *Medical Care Research and Review* 2000;57:298–318.10.1177/107755870005700302 [PubMed: 10981187]
3. Ayanian JZ, Weissman JS, Schneider EC, Ginsburg JA, Zaslavsky AM. Unmet health needs of uninsured adults in the United States. *Journal of the American Medical Association* 2000;284:2061–2069.10.1001/jama.284.16.2061 [PubMed: 11042754]
4. Newacheck PW, Stoddard JJ, Hughes DC, Pearl M. Health insurance and access to primary care for children. *The New England Journal of Medicine* 1998;338:513–519.10.1056/NEJM199802193380806 [PubMed: 9468469]

5. Currie J, Gruber J. Health insurance eligibility, utilization of medical care, and child health. *The Quarterly Journal of Economics* 1996;111:431–466.10.2307/2946684
6. Busch SH, Duchovny N. Family coverage expansions, impact on insurance coverage and health care utilization of parents. *Journal of Health Economics* 2005;24:876–890.10.1016/j.jhealeco.2005.03.007 [PubMed: 15998548]
7. Olson LM, Tang SS, Newacheck P. Children in the United States with discontinuous health insurance coverage. *The New England Journal of Medicine* 2005;353:382–391.10.1056/NEJMsa043878 [PubMed: 16049210]
8. Aiken KD, Freed GL, Davis MM. When insurance status is not static: Insurance transitions of low-income children and implications for health and health care. *Ambulatory Pediatrics* 2004;4:237–243.10.1367/A03-103R.1 [PubMed: 15153059]
9. Levy, H.; Meltzer, D. What do we really know about whether health insurance affects health?. Ann Arbor, MI: Economic Research Initiative on the Uninsured, EIRU Working Paper 6; 2001.
10. Lyons-Ruth, K.; Wolfe, R.; Lyubchik, A.; Steingard, R. Depressive symptoms in parents of children under age 3: Sociodemographic predictors, current correlates, and associated parenting behaviors. In: Halfon, N.; McLeam, K.; Schuster, M., editors. *Child rearing in America; Challenges facing parents with young children*. Cambridge, England: Cambridge University Press; 2000. p. 217-259.
11. Miranda J, Green BL. The need for mental health services research focusing on poor young women. *The Journal of Mental Health Policy and Economics* 1999;2:73–80.10.1002/(SICI)1099-176X(199906)2:2<73::AID-MHP40>3.0.CO;2-3 [PubMed: 11967411]
12. Jayakody R, Danziger S, Pollack HA. Welfare reform, substance use and mental health. *Journal of Health Politics, Policy and Law* 2000;25:623–651.10.1215/03616878-25-4-623
13. Teitler J, Reichman NE, Nepomnyaschy L. Sources of support, child care, and hardship among unwed mothers, 1999–2001. *Social Service Review* 2004;78:125–148.10.1086/380770
14. DeKlyen M, Brooks-Gunn J, McLanahan S, Knab J. The mental health of married, cohabiting, and non-coresident parents with infants. *American Journal of Public Health* 2006;96:1836–1841.10.2105/AJPH.2004.049296 [PubMed: 16571717]
15. Dawson G, Ashman S, Panagiotides H, Hessel D, Self J, Yamada E, et al. Preschool outcomes of children of depressed mothers: Role of maternal behavior, contextual risk, and children's brain activity. *Child Development* 2003;74:1158–1175.10.1111/1467-8624.00599 [PubMed: 12938711]
16. McLearn KT, Minkovitz CS, Strobino DM, Marks E, Hou W. Maternal depressive symptoms at 2 to 4 months post partum and early parenting practices. *Archives of Pediatrics and Adolescent Medicine* 2006;160:279–284.10.1001/archpedi.160.3.279 [PubMed: 16520447]
17. Perry C. Does treating maternal depression improve child health management? The case of pediatric asthma. *Journal of Health Economics* 2008;27:157–173.10.1016/j.jhealeco.2007.03.005 [PubMed: 17498828]
18. Druss BG, Rosenheck RA. Mental disorders and access to medical care in the United States. *The American Journal of Psychiatry* 1998;155:1775–1777. [PubMed: 9842793]
19. Blumberg LJ, Nichols LM. The health status of workers who decline employer-sponsored coverage. *Health Affairs* 2001;20:180–187.10.1377/hlthaff.20.6.180 [PubMed: 11816657]
20. Emptage N, Sturm R, Robinson R. Depression and comorbid pain as predictors of disability, employment, insurance status, and health. *Psychiatric Services (Washington, DC)* 2005;56:468–474.10.1176/appi.ps.56.4.468
21. Masaquel, A.; Ettner, S. How does the persistence of depression influence the continuity, type and generosity of health insurance coverage? Economic research initiative on the uninsured. Ann Arbor: University of Michigan; 2005.
22. Private Health Insurance. Access to Individual Market Coverage May be Restricted for Applicants with Mental Disorders. Washington, DC: United States General Accounting Office; 2002. GAO-02-339
23. Harris KM, Carpenter C, Bao Y. The effects of state parity laws on the use of mental health care. *Medical Care* 2006;44:449–505.10.1097/01.mlr.0000215813.16211.00
24. Reichman NE, Teitler JO, Garfinkel I, McLanahan S. Fragile families: Sample and design. *Children and Youth Services Review* 2001;23:303–326.10.1016/S0190-7409(01)00141-4

25. Carroll A, Corman H, Noonan K, Reichman NE. Why do poor children lose health insurance in the SCHIP era? The role of family health. *American Economic Review Papers and Proceedings* 2007;97:398–401.
26. Mirwosky J, Ross C. Age and the effect of economic hardship on depression. *Journal of Health and Social Behavior* 2001;42:132–150.10.2307/3090174 [PubMed: 11467249]
27. Kessler R, Andrews G, Mroczek D, Ustun T, Wittchen H. The World Health Organization composite international diagnostic interview short-form (CIDI-SF). *International Journal of Methods in Psychiatric Research* 1998;7:171–185.10.1002/mpr.47
28. American Psychiatric Association. *Diagnostic and statistical manual of mental disorders*. Vol. 4. Washington, DC: American Psychiatric Association; 1994.
29. Barry CL, Gabel JR, Frank RG, Hawkins S, Whitmore HH, Pickreign JD. Design of mental health benefits: Still unequal after all these years. *Health Affairs* 2003;22:127–137.10.1377/hlthaff.22.5.127 [PubMed: 14515888]
30. Zuvekas SH, Meyerhoefer CD. Coverage for mental health treatment: Do the gaps still persist? *The Journal of Mental Health Policy and Economics* 2006;9:155–163. [PubMed: 17031020]
31. Rowland D, Garfield R, Elias R. Accomplishments and challenges in Medicaid mental health. *Health Affairs* 2003;22:78–83.
32. Feinberg E, Swartz K, Zaslavsky A, Gardner J, Walker D. Language proficiency and the enrollment of Medicaid-eligible children in publicly funded health insurance programs. *Maternal and Child Health Journal* 2002;6:5–18.10.1023/A:1014308031534 [PubMed: 11926255]
33. Medicaid and SCHIP Eligibility for Immigrants. Kaiser Commission on Medicaid and the Uninsured. 2006 [Accessed September 21, 2008]. at <http://www.kff.org/medicaid/upload/7492.pdf>
34. Ettner SL, Frank RG, Kessler RC. The impact of psychiatric disorders on labor market outcomes. *Industrial and Labor Relations Review* 1997;51:64–81.10.2307/2525035
35. Marcotte DE, Wilcox-Gök V. Estimating the employment and earnings costs of mental illness: Recent developments in the United States. *Social Science and Medicine* 2001;53:21–27.10.1016/S0277-9536(00)00312-9 [PubMed: 11386306]
36. Rost K, Smith JL, Dickinson M. The effect of improving primary care depression management on employee absenteeism and productivity: A randomized trial. *Medical Care* 2004;42:1202–1210.10.1097/00005650-200412000-00007 [PubMed: 15550800]
37. Minkovitz CS, Strobino D, Scharfstein D, Hou W, Miller T, Mistry K, et al. Maternal depressive symptoms and children's receipt of health care in the first 3 years of life. *Pediatrics* 2005;115:306–314.10.1542/peds.2004-0341 [PubMed: 15687437]
38. Coiro, M. Maternal depressive symptoms as a risk factor for the development of children in poverty. In: Moore, KA., editor. *Factors in the development of children in welfare families: An ecological perspective*; Symposium presented at the meetings of the Society for Research in Child Development; Washington, DC. 1997.
39. Connelly CD, Baker M, Hazen A, Mueggenborg MG. Pediatric health care providers' self-reported practices in recognizing and treating maternal depression. *Pediatric Nursing* 2007;33:165–173. [PubMed: 17542239]
40. Gjerdingen DK, Yawn BP. Postpartum depression screening: Importance, methods, barriers, and recommendations for practice. *Journal of the American Board of Family Medicine* 2007;20:280–288.10.3122/jabfm.2007.03.060171 [PubMed: 17478661]
41. Rost K, Pyne JM, Dickinson LM, LoSasso AT. Cost-effectiveness of enhancing primary care depression management on an ongoing basis. *Annals of Family Medicine* 2005;3:7–14.10.1370/afm.256 [PubMed: 15671185]
42. LoSasso A, Rost K, Beck A. Modeling the impact of enhanced depression treatment on workplace functioning and costs: A cost benefit approach. *Medical Care* 2006;44:352–358.10.1097/01.mlr.0000204049.30620.1e [PubMed: 16565636]
43. Salkever DS, Shinogle JA, Goldman H. Return to work and claim duration for workers with long-term mental disabilities: Impacts of mental health coverage, fringe benefits, and disability management. *Mental Health Services Research* 2003;5:173–186.10.1023/A:1024495402862 [PubMed: 15224450]

44. Schillerstrom JE. Executive control function in psychiatric and medical illness. *Journal of Psychiatric Practice* 2002;8:160–169.10.1097/00131746-200205000-00005 [PubMed: 15985873]

Table 1

Sample characteristics (proportions unless indicated otherwise)

	Health insurance at follow-up			
	Private (N = 983)	Public (N = 1155)	Uninsured (N = 818)	Full- Sample (N = 2956)
Mother's prenatal health				
Diagnosed mental illness ***	.07	.14	.12	.11
Physical health condition ***	.18	.23	.17	.20
Mother's other characteristics				
Age (mean, in years) *	27.28	23.32	24.21	24.88
High school education or more ***	.86	.53	.55	.65
Foreign-born ***	.14	.09	.24	.15
Worked in past 2 years ***	.88	.77	.78	.81
Private insurance for the birth ***	.71	.14	.16	.34
% Below poverty in census tract (mean)	.13	.24	.20	.19
First birth **	.40	.34	.39	.38
Multiple birth	.02	.02	.01	.02
<i>Relationship status</i> ***				
Married to child's father	.49	.07	.15	.23
Cohabiting with child's father	.29	.37	.47	.37
Neither married nor cohabiting	.22	.56	.38	.17
<i>Race/Ethnicity</i> ***				
Non-Hispanic Black	.38	.64	.39	.48
Hispanic	.20	.22	.44	.28
White and other	.42	.14	.17	.24
Family characteristics				
Child has diagnosed health condition	.20	.19	.20	.20
Father reported suboptimal health ***	.18	.24	.28	.23
Father depression score (CES-D) (mean) **	1.10	1.38	1.21	1.24
Father is (was) in military ***	.13	.06	.08	.09
Father was employed ***	.87	.66	.76	.76
Father had insurance through employer ***	.64	.31	.35	.43
Father missing baseline interview ***	.12	.25	.18	.19
Mother's follow-up characteristics				
Screened positive for anxiety and/or depression (CIDI) ***	.09	.15	.17	.14
Reported being disabled ***	.04	.12	.06	.08
Reported suboptimal health ***	.29	.41	.46	.38

	Health insurance at follow-up			
	Private (<i>N</i> = 983)	Public (<i>N</i> = 1155)	Uninsured (<i>N</i> = 818)	Full-Sample (<i>N</i> = 2956)
Got married**	.09	.06	.08	.08
Currently employed***	.74	.38	.49	.53
New pregnancy between baseline and follow-up***	.17	.30	.16	.22

* $P < .05$

** $P < .01$

*** $P < .001$ for differences across insurance status, on the basis of χ^2 tests (F -test for age, % below poverty in census tract, father's depression score, months since baseline interview)

Table 2Multinomial logit estimates of health insurance status of mothers with one-year-old children ($N = 2956$)

	Mother's health insurance status at follow-up			
	Basic model		Augmented model	
	Private RRR [CI]	Public	Private RRR [CI]	Public
Mother's prenatal health				
Diagnosed mental illness	0.51 *** [.35,.75]	0.81 [.58, 1.13]	.64 ** [.45,.91]	.78 [.55, 1.12]
Physical health condition	1.07 [.75, 1.53]	1.22 [.93, 1.61]	1.08 [.74, 1.57]	1.11 [.85, 1.46]
Mother's baseline characteristics				
Age (years)	1.01 [.98, 1.03]	0.97 *** [.95,.99]	1.01 [.98, 1.03]	.98 ** [.96, 1.00]
High school education or more	1.86 *** [1.41, 2.46]	0.92 [.75, 1.14]	1.65 *** [1.20, 2.27]	1.02 [.81, 1.28]
Non-Hispanic Black	.85 [.61, 1.19]	1.06 [.75, 1.50]	.80 [.56, 1.15]	1.11 [.76, 1.61]
Hispanic	.51 *** [.36,.73]	.62 ** [.42,.91]	.49 *** [.31,.75]	.64 ** [.43,.97]
Foreign-born	.46 *** [.34,.63]	.37 *** [.26,.52]	.46 *** [.33,.65]	.35 *** [.25,.51]
Worked in past 2 years	1.32 [.92, 1.89]	0.85 [.67, 1.08]	.92 [.63, 1.33]	1.05 [.82, 1.35]
Private insurance for the birth	5.92 *** [4.27, 8.23]	1.03 [.82, 1.30]	5.99 *** [4.31, 8.31]	1.09 [.85, 1.40]
% below poverty in census tract	.08 *** [.04,.20]	2.99 *** [1.35, 6.59]	.09 *** [.04,.21]	2.48 ** [1.09, 5.65]
Married to child's father	2.72 *** [1.95, 3.79]	.54 *** [.38,.76]	3.46 *** [2.42, 4.95]	.51 *** [.35,.74]
Cohabiting with child's father	1.09 [.79, 1.51]	.71 *** [.59,.85]	1.02 [.75, 1.38]	.68 *** [.55,.84]
First birth	.91 [.73, 1.12]	.69 *** [.58,.83]	.85 [.69, 1.05]	.68 *** [.58,.80]
Multiple birth	1.52 [.64, 3.61]	1.79 [.87, 3.69]	1.78 [.81, 3.93]	1.71 [.80, 3.66]
Family baseline characteristics				
Child has diagnosed health condition	.99 [.77, 1.30]	.95 [.75, 1.22]	.95 [.74, 1.22]	.95 [.73, 1.22]
Father reported suboptimal health	.73 ** [.57,.93]	1.07 [.85, 1.34]	.75 ** [.59,.95]	1.06 [.38, 1.36]
Father depression score (CES-D)	1.03 [.96, 1.11]	1.06 ** [1.00, 1.11]	1.01 [.94, 1.08]	1.05 [1.00, 1.11]
Father was (is) in military	1.14 [.69, 1.87]	.91 [.57, 1.47]	1.11 [.64, 1.96]	.97 [.59, 1.57]
Father was employed	1.00 [.75, 1.34]	.88 [.69, 1.12]	0.96 [.69, 1.35]	.91 [.70, 1.17]
Father had insurance through employer	1.71 *** [1.40, 2.09]	1.15 [.94, 1.42]	1.69 *** [1.37, 2.08]	1.15 [.93, 1.42]
Father missing baseline interview	1.29 * [.97, 1.70]	1.39 ** [1.00, 1.94]	1.25 [.93, 1.68]	1.51 ** [1.09, 2.09]
Mother's follow-up characteristics				
Screened positive for anxiety and/or depression (CIDI)	—	—	.51 *** [.36,.73]	.75 * [.56, 1.01]
Reported being disabled	—	—	1.19 [.61, 2.33]	1.81 ** [1.15, 2.85]
Reported suboptimal health	—	—	.77 * [.57, 1.04]	.89 [.70, 1.14]
Got married	—	—	3.04 *** [2.07, 4.46]	.86 [.57, 1.31]

	Mother's health insurance status at follow-up			
	Basic model		Augmented model	
	Private RRR [CI]	Public	Private RRR [CI]	Public
Currently employed	–	–	2.78 ^{***} [2.18, 3.55]	.56 ^{***} [.45,.68]
New pregnancy between baseline and follow-up	–	–	1.50 ^{**} [1.01, 2.23]	1.88 ^{***} [1.30, 2.72]

^{***} Significant at 1% level

^{**} Significant at 5% level

^{*} Significant at 10% level

Privately insured: $N = 983$; publicly insured: $N = 1155$; uninsured: $N = 818$; RRR = relative risk ratio; CI = confidence interval

All models include controls for mother's state of residence at the time of the birth and the number of months between the mother's baseline and follow-up interview (estimates not shown)