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The impact of welfare reform on the health insurance coverage, utilization and health of low education single mothers

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ABSTRACT

The Personal Responsibility Work Opportunity and Reconciliation Act (PRWORA) of 1996 imposed time limits on the receipt of welfare cash benefits and mandated cash benefit sanctions for failure to meet work requirements. Many studies examining the health implications of PRWORA have found associated declines in health insurance coverage and healthcare utilization among single mothers but no impact of PRWORA on health outcomes. A limitation of this literature is that most studies cover a time period before time limits were implemented in all states and also before individuals began actually timing out. This work builds on previous studies by exploring this research question using data from the Survey of Income and Program Participation that covers a time period after all states have implemented time limits (1991–2009). We use a difference-in-differences study design that exploits variability in eligibility for cash welfare benefits by marital status and state-level variation in timing of PRWORA implementation to identify the effect of PRWORA. Using ordinary least square regression models, controlling for state-level and federal policies, individual-level demographics and state and year fixed-effects, we find that PRWORA leads to 7 and 5 percentage point increases in self-reported poor health and self-reported disability among white single mothers without a diploma, respectively.

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1. Introduction

In 1935 Aid to Families with Dependent Children (AFDC), better known as welfare, was established to provide financial assistance to single mothers of minor children. AFDC enrollment guaranteed a set income for families each month as long as their earnings remained under the eligibility threshold. Starting in the 1960s, AFDC-eligible families were also jointly enrolled in Medicaid. The cost of AFDC was shared between the federal government and the states, with the federal government providing matching funds to each state. States were prohibited from instituting AFDC eligibility criteria that were more stringent than the criteria imposed by the federal government (Patterson and Patterson, 2000).

In 1996 the Personal Responsibility Work Opportunity and Reconciliation Act (PRWORA), also known as welfare reform, replaced AFDC with Temporary Assistance for Needy Families (TANF). TANF differed from AFDC in several ways, including the imposition of work requirements to receive benefits, mandatory benefit sanctions for failure to meet work requirements and a time-limit for benefit receipt. The federal government gave the states authority to set benefit eligibility criteria more stringent than the federally mandated criteria. The funding streams for AFDC and TANF also differed. Rather than providing states with matching funds, the federal government provided states with a block grant or set amount of money that was frozen at 1996 funding levels. The administrative relationship between welfare and Medicaid was also severed; however, Medicaid eligibility criteria was expanded to include families not receiving welfare that otherwise met financial criteria for welfare receipt (Schott, 2012).

In the period immediately after implementation of welfare reform, welfare caseloads declined and employment increased

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among single mothers with low levels of education (Falk, 2013). A trend of declining welfare caseloads that began in the mid 1990s continued after implementation of welfare reform. Between 1994 and 2008, the size of the welfare caseload declined from 5.1 million to 1.7 million. The share of single mothers with low education working rose from 49% in 1995 to 64% in 1999. Average incomes for single mothers increased over the 1990s, although average incomes declined for the lowest earning fifth of single mothers (Jeffrey Grogger et al., 2002). Starting in the early 2000s, employment gains began to reverse among single mothers with low levels of education. In 2003 the proportion of single mothers with low education working declined to 60%. As of 2009, this figure had dropped to 54% (Jeffrey Grogger et al., 2002). The proportion of single mothers neither working nor receiving government cash benefits also increased from 13% to 20% between 1996 and 2008 (Pavetti and Schott, 2011). Additionally, a smaller proportion of income eligible families have obtained welfare benefits. In 1995 the welfare program assisted 75% of families with children living in poverty; as of 2009 that figure had dropped to 28% (Pavetti and Schott, 2011).

Women's health advocates have voiced concern about the potential implications of welfare reform for the health of women. There are several mechanisms by which this policy may have impacted the health of this population. The most often stated mechanisms include loss of health insurance coverage, loss of income and increased psychological stress. Loss of health insurance may result if an individual gets kicked off of welfare or leaves welfare for employment in a firm that does not provide health insurance and fails to complete the administrative process for securing Medicaid coverage. Lack of health insurance coverage has been repeatedly linked to lack of a usual source of care, less receipt of preventive care and delaying of needed medical care (Lavarreda and Cabezas, 2011). Conversely, broadening Medicaid eligibility to encompass individuals who are financially eligible for welfare but not receiving it could have the effect of increasing health insurance coverage and access to health care in low-income mothers (Shore-Sheppard and Ham, 2003). Another potential mechanism by which welfare reform may have impacted health is through reductions in household income; these could result from sanctions or loss of cash benefits, as a consequence of exceeding time limits. A socioeconomic-driven morbidity and mortality gradient has been demonstrated across conditions that are amenable to medical intervention as well as those that are not (Mackenbach et al., 1989). Welfare reform may also increase stress for low-income women. Loss of income or income volatility may result in economic hardship, increasing stress levels. One study of welfare recipients found that sanctioned individuals had increased odds of having a utility shut off within the last year and had increased odds of expecting to experience inadequate housing, food or medical care within the next two months, compared to their non-sanctioned counterparts (Ariel Kalil, 2002). Welfare reform may also have adverse impacts on health as a consequence of increasing employment in this group. Although prior research has shown positive health impacts of employment in married mothers, such may not be the case with this cohort. The impact of employment on health may be moderated by job type and most of these women are relegated to working at low wage, low autonomy and repetitive jobs, the type of jobs that are associated with increased stress levels (Lennon, 1994). These jobs are also less likely to provide sick leave or predictable schedules which may limit the ability to engage in health-promoting behaviors, such as making a doctor's appointment (Brodkin and Marston, 2013).

The majority of studies investigating the health implications of welfare reform have focused on the link between welfare reform and potential mediators of health, such as health insurance coverage and health care utilization. Regarding the impact of welfare reform on health insurance coverage, some studies have found negative impacts, others have found positive impacts and some have found no impact at all (Bitler et al., 2004; DeLeire et al., 2006; Handler et al., 2006). With respect to health care utilization, associated declines in health care utilization have been observed along with increased reports of needing care but finding it unaffordable, in the broader target population (Bitler and Hoynes, 2006; Danziger et al., 2000).

The body of research on the direct health impacts of welfare reform is more limited in volume than the research on the health insurance and health care utilization impacts and it has some challenges with respect to external validity. Some studies have focused on single states or left out states with a large proportion of the affected population, as a consequence of data limitations (Bitler et al., 2004; Kaestner, 2004). Nonetheless, some studies have found positive associations between welfare reform and mortality, while others have found no health impacts of welfare reform at all. An issue for the vast majority of the studies on this topic or any of the previous topics discussed is that they cover a relatively short period of time after welfare reform implementation, during which a key piece of welfare reform, time limits, was not fully implemented (Bitler et al., 2004; Kaestner, 2004).

This study builds on the previous research on the health insurance, health care utilization and health impacts of welfare reform by employing a methodologically rigorous study design and using a nationally representative data set that includes time periods before and after all states have implemented time limits, to address three primary research questions: (1) what impact did welfare reform have on the health insurance coverage?, (2) what impact did welfare reform have on the annual medical provider contact? and (3) what impact did welfare reform have on the health outcomes? We also explored whether the impact of welfare reform, on the outcomes specified above, differed by race/ethnicity.

2. Literature review

Studies using robust methods have explored the relationship between welfare reform, health insurance coverage and in some cases health care utilization, among single mothers; however, the bulk of these studies only covered time periods extending into the early 2000s. These studies used similar quasi-experimental designs, with slight variations in the treatment population, control groups, measures of welfare reform and covariates. Kaestner and Kaushal used data from the March Current Population Survey (1993—2000) and a Difference-In-Differences (DID) study design (Kaestner and Kaushal, 2003). The treatment group was single mothers with 12 years or less education. The two comparison groups were single women without children and married women with children, with 12 years of education or less. They used the post-reform change in welfare caseload size as a proxy for welfare reform implementation. Controlling for individual-level demographic factors, family composition, size of welfare population, Medicaid eligibility criteria and state-level economic indicators, as well as state and year fixed-effects, they found that welfare reform was associated with a 3—4 percentage point reduction in Medicaid coverage and a 0.5 to 2.3 percentage point increase in not having any health insurance, depending on the comparison group used.

Bitler et al. (2004) used data from the Behavior Risk Factor Surveillance Survey (BRFSS) (1991—2000) and used both DID and Difference-in-Difference-in-Differences (DDD) study designs (Bitler et al., 2004). They conducted analyses using several different treatment groups including single women living with children, with 12 or fewer years of education, black single women living with children, all single women with 12 or fewer years of education, all black single women and all Hispanic single women. The

comparison groups were single women living without children, married women living with children and married women, for the respective racial/ethnic subgroups. They measured welfare reform using dummy variables for state waiver and TANF implementation. Controlling for individual demographic variables, welfare benefit level, public insurance eligibility criteria and state-level economic markers as well as state, month and year fixed-effects, Bitler et al., 2004 found that welfare reform did not have an effect on the health insurance coverage of single women living with children, single women generally or black single women; however, TANF was associated with a 10.5 percentage point decline in the health insurance coverage of black women living with children and 14 percentage point decline in the health insurance coverage of Hispanic single women (Bitler et al., 2004). They also found a negative relationship between welfare reform and having had a breast exam or checkup in the last year, among black single mothers and an 8.2 percentage point increase in probability of needing care but finding it unaffordable, among low education single women living with children.

Cawley et al. took a similar approach to Bitler et al., 2004 using the Survey of Income and Program Participation (SIPP) (1992–1999); however, given the panel nature of their data, they were able to control for individual level fixed-effects. The treatment group was single mothers with 12 years of education or less and the comparison group was married mothers with the same educational background. Using a DID study design, they found that implementing welfare reform was associated with 8.1 percentage point increase in the probability of not having health insurance among single mothers with low levels of education, controlling for demographics, family structure, maximum welfare benefit level, state economic indicators, public health insurance eligibility criteria and Earned Income Tax Credit (EITC) implementation, as well as state, year and individual fixed-effects (Cawley et al., 2006).

Simon and Handler (2008) also used SIPP (1990–1999) and a DID study design (Simon and Handler, 2008). They examined the impact of welfare reform on health insurance coverage at four different periods relative to childbirth (12 months before, 7 months before, 1 month before and 10 months postpartum). Looking at women 12 months prior to delivery, Simon and Handler found that welfare reform was associated with a 7 percentage point decline in Medicaid coverage and no corresponding increase in private health insurance coverage among low education single mothers, controlling for individual demographic factors, family composition, welfare generosity, Medicaid generosity, state economic indicators, and state, year and panel fixed-effects. They also found an 11.5 percentage point decline in Medicaid coverage and an 8.6 percentage point increase in private health insurance coverage among low-education single mothers at 10 months postpartum. After including data covering a longer period after welfare reform implementation in this analysis (1990–2003 vs.1990–1999), only the effects of welfare reform on the health insurance coverage of low education single mothers at 10 months postpartum remained significant.

In summary, most of these studies concluded that welfare reform had a modest negative impact on the health insurance coverage for some subgroups of single mothers with low education. However, data analyzed in all of these studies spanned a time period before all states implemented time limits, a key provision of welfare reform. In 2001, there were still 19 states that had yet to implement time limits. Additionally, individuals did not start timing out of federal benefits until 2001 (Farrell et al., 2008). Consequently, these studies are only able to detect the anticipatory effect of time limits but not the mechanical impact.

With respect to the direct health impacts of welfare reform, few studies cover a time period beyond the early 2000s and those that

do, have external validity limitations. Schmidt and Sevak (2004), used a DID approach to examine the impact of welfare reform on the self-reported disability of single mothers (Schmidt and Sevak, 2004). The data source was the Current Population Survey (1987–1996), the treatment group was female heads of household and three different comparison groups were used: married mothers, single women without children and married men. State-level waivers were used as a proxy for welfare reform. Controlling for individual level demographics, SSI and welfare benefit levels, state unemployment, and public health insurance eligibility levels for SSI recipients along with state and year fixed-effects, they found that welfare reform was not associated with an increase in self-reported disability, among female heads of household.

Kaestner and Tarlov (2006) used BRFSS data (1993–2000) to examine the impact of welfare reform on the health of single mothers with low levels of education. The treatment group for this analysis was women with 12 years of education or less. The two comparison groups were married mothers and single men, both with 12 years of education or less. They used the post welfare reform caseload decline as a proxy for welfare reform. Controlling for individual demographic variables, public health insurance eligibility criteria, state-level economic indicators and fixed-effects, this study did not find a relationship between welfare reform and self-reported health or self-reported days in poor mental health (Kaestner and Tarlov, 2006). The Bitler et al. (2004) study, referenced above, also addressed this research question and found no significant increase in reported days limited, days depressed or self-rated poor/fair health associated with welfare reform, among single women with low levels of education, living with children. A limitation of the Kaestner and the Bitler studies results from the data set used for the analysis. The California BRFSS survey administered during this time frame did not include questions about household composition; consequently, this measure was not used in either analysis.

Two studies took advantage of state welfare waiver experiments to explore the longitudinal effects of welfare reform on the mortality of welfare recipients, one in Connecticut and the other in Florida (Muennig et al., 2013; Wilde et al., 2014). Both studies linked individual data from welfare recipients to the Social Security Death Master file. Examining deaths through 2010, Wilde et al. (2014) found that welfare recipients assigned to the TANF-type policy bundle in Connecticut had a non-significant trend towards higher mortality controlling for age, marital status, gender, number of children, years of education and local welfare office. Evaluating deaths through 2011, Muennig et al. (2013) found that welfare recipients assigned to the welfare reform type policy bundle in Florida had a 16% higher mortality controlling for age, year of randomization and location. It is worth noting that although both Connecticut and Florida had time limits as part of their policy bundle, the Connecticut waiver had a generous earnings disregard as part of the reform policy package from the outset of the waiver and an extended duration of transitional Medicaid eligibility (2–3 years) for individuals leaving welfare and Florida did not. These results are notable because they show health consequences of these changes to welfare policy, despite a relatively short time of differential exposure between the treatment and control groups; however, the regional focus of the results limits their external validity. Nonetheless, it is possible that null results from more representative studies reflect insufficient lead times to observe health effects or reduced effect size of welfare reform, resulting from partial welfare reform implementation.

3. Data and methods

The data source for this study was the Survey of Income and

Program Participation (SIPP). The SIPP is a continuous series of national panels. The sampling universe is the resident population of the United States, above the age of 14, excluding people living in institutions or military barracks. Each sampled household is interviewed at four-month intervals. Each interview period constitutes a core study wave. The survey has topics that are covered during each core wave, including health insurance coverage and disability status. Periodically certain topics, such as healthcare utilization and health status, are covered more in-depth, in health topical modules. This survey also has unique state-level identifiers for most states. The 1992, 1993, 1996, 2001, 2004 & 2008 panels, which covered the time period spanning from 1991 to 2009, were used for this study. Information on state-level welfare policies and state-level unemployment was imported from the Urban Institute's Welfare Rules Database (Urban Institute, 2014) and the Bureau of Labor Statistics (Bureau of Labor Statistics, 2016), respectively.

The study sample consisted of women who responded during the first core interview wave, flagged as the parent or guardian of a minor child. The sample was further limited to women who were the mothers of these minors, without a high school diploma or GED, and between the ages of 17 and 55. This sample also excluded women residing in Iowa, Main, North Dakota, South Dakota, Vermont and Wyoming because these states did not have unique identifiers in the 1992, 1993 or 1996 SIPP panels (1.28% of the population). An additional study sample, consisting of respondents from the same SIPP panels listed above, was constructed by merging the core waves to the corresponding health topical module. This sample was slightly different because respondents to the core wave that corresponds to the first health topical module for each SIPP panel were used instead of respondents from the first core wave of the panel. The respondents from the first core waves and subsequent waves may differ for a myriad of reasons; people may leave the sample universe; sample attrition may occur and individuals may join the sample by moving to one of the sampled addresses. In addition to dropping the same states mentioned above for the core wave analyses, Alaska was dropped from analyses using the health topical modules because it did not have pre- and post-welfare reform data points among the years covered by the core wave/topical module combinations.

3.1. Study design

The most salient study design challenge for the research questions evaluating the health impact of welfare reform is separating out this impact from those due to changes in the economy and temporally proximal changes in the policies of other means-tested programs. In order to isolate the effect of welfare reform from other secular time trends in the circumstances of single mothers, a DID study design was used. To construct a DID analysis, pre- and post-welfare reform data must be available for single mothers (treatment group) and married mothers (comparison group). The pre-post outcome change in the single mothers reflects the combined impact of welfare reform and any secular trends in the outcome of interest. Subtracting the pre-post welfare reform difference among the married mothers from that among the single mothers will net out the secular time trends and the permanent differences between the treatment and comparison groups, leaving an unbiased effect estimate of welfare reform on the outcome of interest, under certain assumptions (Athey and Imbens, 2006). A pre-requisite of the DID analysis is that the composition of single mothers or married mothers does not change in response to the treatment. Two additional assumptions underlie the use of the DID study design. The first assumption is that in the absence of welfare reform, the secular time trends for the single mothers and married mothers would not differ with respect to the outcomes of interest.

The second assumption is that the married mothers are not affected by welfare reform. Use of married mothers as a comparison group violates this DID assumption since some states did have two-parent eligibility for welfare before and after welfare reform. However, single mothers are much more likely than married mothers to qualify for welfare receipt, due to financial eligibility criteria (Athey and Imbens, 2006). The projected effect of this DID assumption violation is a bias in the effect estimates of welfare reform towards the null of no effect of welfare reform. In order to assess the extent of these potential biases, sensitivity analyses were performed using a different comparison group, single childless women. If the results of the analyses are robust to comparison group specification it is less likely that the observed results are an artifact of comparison group selection, since it is unlikely that the direction of the bias for both comparison groups will be in the same direction (Meyer, 1995).

3.2. Welfare reform

Pre- and post-welfare reform observation status was assigned based on the welfare policy profile of the state in the year and month of the observation. If a state either had a federal welfare waiver including time limits or sanctions or TANF implemented by the year and month of the observation, the reform variable was coded as "1"; otherwise the variable was coded as "0." For responses pertaining to outcomes for the current month, see Table 1 (Grogger and Karoly, 2005). For the question pertaining to outcomes in the previous year (annual medical provider contact), we constructed the state welfare reform variables using the 12-month period before the interview month. If reform (either waiver or TANF) was implemented at some time during the 12-month recall period, the reform variable was the fraction of the 12 month period that welfare reform is in place, starting in the month after implementation; otherwise the variable was coded as "0".

3.3. Single mother status

Single mother status was assigned based on the responses to

Table 1
Month and year of TANF or welfare waiver (time limits or sanctions) implementation.

1994	1995	1996	1997	1998
Georgia-1	Arizona-11	Alabama-11	Alaska-7	California-1
	Delaware-10	Connecticut-1	Arkansas-7	
	Illinois-10	Florida-10	Colorado-7	
	Indiana-5	Kansas-10	D.C.-3	
	Nebraska-10	Kentucky-10	Hawaii-7	
	Virginia-7	Maryland-10	Idaho-7	
		Massachusetts-9	Louisiana-1	
		Michigan-9	Minnesota-7	
		Missouri-12	Mississippi-7	
		Nevada-12	Montana-2	
		New Hampshire-10	New Jersey-7	
		North Carolina-7	New Mexico-7	
		Ohio-7	New York-11	
		Oklahoma-10	Pennsylvania-3	
		Oregon-7	Rhode Island-5	
		South Carolina-10		
		Tennessee-9		
		Texas-6		
		Utah-10		
		Washington-1		
		West Virginia-2		
		Wisconsin-1		

All data for welfare waivers and TANF implementation was obtained from the book *Welfare Reform*, by Grogger and Karoly. The number after each state refers to the month of welfare reform implementation.

two questions, 1) "Are you currently married, widowed, divorced, separated or never married?" and 2) Is your spouse a member of this household? Women who responded that they are either "never married", "widowed", "divorced", "separated" or "married, spouse absent" were classified as single mothers. This categorization schema is consistent with welfare eligibility determination criteria. An indicator variable for single mother status was coded as "1" if the observation was from a single mother and coded as "0" otherwise. The primary predictor for all DID analyses was the product of the indicator variables for single mother status and welfare reform implementation.

3.4. Dependent variables

The primary outcomes for this analysis were health insurance coverage, self-reported disability, self-reported poor health and annual medical provider contact. Three separate indicator variables were created for Medicaid coverage, private health insurance coverage and uninsurance. The indicator for Medicaid coverage was coded as "1" if a person responded "yes" to the question, "Was … covered by Medicaid in this month?" and coded as "0" otherwise. The indicator for private health insurance coverage was coded as "1" if a person responded "yes" to the question, "Was … covered by a health insurance plan other than Medicare or Medicaid?" and coded "0" otherwise. The indicator for uninsurance was coded as "1" if the person responded "no" to both of the previously stated health insurance questions. An indicator variable for disability was coded as "1" if a person responded "yes" to the question "Does … have a physical, mental or other health condition that limits the kind or amount of work … can do?" and "0" otherwise. An indicator variable for self-reported poor health was coded as "1" if a person answered "fair" or "poor" to the question "Would you say your health in general is excellent, very good, good, fair, or poor?" and coded as "0" otherwise. Previous studies examining the impact of welfare reform on health status have used a similar approach (Kaestner, 2003; Seccombe et al., 2006). A variable capturing the number of medical provider contacts in the last year was treated as a continuous variable. The descriptive statistics for outcome variables from the core waves and health topical modules are found in Tables 2A, 2B and 3, respectively.

3.5. Covariates

We controlled for a number of individual-level demographic and family structure characteristics that have been linked with welfare use, including age, race/ethnicity and number of minor children (Chan, 2014). We also controlled for state-level variables that could be correlated with the timing of welfare reform implementation as well as health insurance coverage, health care utilization and health outcomes, including the percentage of the Federal Poverty Level at which the following categories of individuals lost eligibility for public health insurance: pregnant women, parents of minors, children less than 6 years old, federal and state Earned Income Tax Credits as well as state unemployment (Mazzolari, 2006).

3.6. Statistical model

The unit of analysis was the person-year for all analyses. To facilitate direct interpretation of the primary predictor, the DID estimator, we estimated linear regression models with robust standard errors, clustered at the state level. Linear regression applied to dichotomous outcomes, also known as a linear probability model (LPM), can be used if the sample size is large, since the distribution of the variables can be assumed to be normal under these circumstances (Lumley et al., 2002). LPM estimates are unbiased but other issues remain. LPMs may produce values outside of the 0–1 range; however, in the case of LPMs with a dichotomous primary regressor, as is the case for the DID estimator, out-of-range values do not occur (Hellevik, 2009). Additionally, LPM standard errors may be inconsistent, as a consequence of the violation of the homoskedacity assumption (Jr et al., 2013). Violation of the homoskedacity assumption is addressed by using robust standard errors, which generate consistent standard errors in the setting of heteroskedastic data (King and Roberts, 2015). A consequence of the use of robust standard errors is that it may be more difficult to find statistically significant results; however, this is a less of a concern with large sample sizes. For an additional robustness check, we performed sensitivity analyses using logistic regression models.

For our main analyses, therefore, we estimated linear regression

Table 2A
Sample characteristics for core waves.

Variables (Mean (SD) or %)	Married (N = 20,789)	P value	Single (N = 15,168)	P value	Single/Childless (N = 11,383)
Dependent Variables					
Was not covered by Medicare, Medicaid or other plan in this month	33%	0.00	24%	0.00	32%
Was covered by Medicaid in this month	18%	0.00	56%	0.00	34%
Was covered by a health insurance plan other than Medicare or Medicaid this month	49%	0.00	20%	0.00	35%
Does have a physical, mental or other health condition that limits the kind or amount of work they can do	9%	0.00	17%	0.00	28%
Covariates					
Federal Earned Income Tax Credit	$3037	0.00	$2911	0.00	$302
State Earned Income Tax Credit	3%[a]	0.00	4%[a]	0.02	3.7%[a]
Public Insurance Eligibility(Pregnant Women)	196(47)	0.00	192 (43)	0.00	191(43)
Public Insurance Eligibility(Parents of Minors)	70(57)	0.00	72(59)	0.09	73(61)
Public Insurance Eligibility(Children <6 years old)	161(97)	0.35	162(97)	0.00	160(95)
Public Insurance Eligibility(Children 6—17 years old)	136(108)	0.00	133(113)	0.00	144(111)
State Unemployment	5.77 (1.43)	0.00	5.70 (1.42)	0.00	5.51(1.39)
Age	35(9)	0.00	32(9)	0.00	34(14)
Black	7%	0.00	31%	0.00	25%
Hispanic Ethnicity	48%	0.00	35%	0.00	19%
>1 Minor Child	69%	0.00	60%	0.00	0%

This data comes from core wave 1 of the 1992, 1993, 1996, 2001, 2004 & 2008 SIPP panels. T-test and test of proportions are used to obtain p-values for continuous and dichotomous variables, respectively. Each p-value refers to the test of the two columns that surround it. The treatment group is single mothers. This data source is used for analysis of the impact of measures of welfare reform on uninsurance, Medicaid coverage, private health insurance coverage and self-reported disability.
[a] This value reflects the percentage the State EITC credit amount comprises of the FEITC credit amount.

Table 2B
Sample characteristics for health topical modules.

Variables (Mean (SD) or %)	Married (N = 4345)	P value	Single (N = 3126)	P value	Single/ Childless (N = 2272)
Dependent Variables					
Not counting contacts during hospital stays during the last 12 months, how many times did you see or talk to a doctor nurse or any medical provider about health?	4(8)	0.00	5(12)	0.75	5(13)
Would you say your health in general is fair or poor?	15%	0.00	22%	0.00	28%
Covariates					
Federal Earned Income Tax Credit	$3153	0.00	$2996	0.00	$305
State Earned Income Tax Credit	3%[a]	0.00	4%[a]	0.93	4%[a]
Public Insurance Eligibility (Pregnant Women)	197(47)	0.00	193 (44)	0.49	192(42)
Public Insurance Eligibility (Parents of Minors)	72(59)	0.02	75(61)	0.14	77(63)
Public Insurance Eligibility (Children <6 years old)	172(88)	0.88	173(85)	0.49	180(83)
Public Insurance Eligibility (Children 6—17 years old)	140(104)	0.00	133(109)	0.00	144(109)
State Unemployment	6.2(2)	0.01	6.1(2)	0.00	5.9(2)
Age	35(8)	0.00	32(10)	0.00	33(14)
Black	7%	0.00	31%	0.00	26%
Hispanic Ethnicity	49%	0.00	34%	0.00	19%
>1 Minor Child	69%	0.00	59%	0.00	0%

This data comes from the merged core wave and health topical modules of the 1992, 1993, 1996, 2001, 2004 & 2008 SIPP panels. T-test and test of proportions are used to obtain p-values for continuous and dichotomous variables, respectively. This data source is used for analysis of the impact of measures of welfare reform on mean annual medical provider contact and self-reported poor health.

[a] This value reflects the percentage the State EITC credit amount comprises of the FEITC credit amount.

Table 3
Impact of welfare reform on the outcomes of single mothers.

Independent Variables	Health Insurance			Utilization	Health Outcomes	
	Percentage Point Difference in Uninsurance[A]	Percentage Point Difference in Having Medicaid[A]	Percentage Point Difference in Having Private Health Insurance[A]	Change in Mean Annual Medical Provider Contact[B]	Percentage Point Difference in Reporting Poor Health[B]	Percentage Point Difference in Reporting Disability[A]
Comparison Groups						
All Races						
Married [1]	**−0.05**	**−0.12**	**0.17**	0.68	0.03	**0.02**
Single/ Childless[2]	0.04	**−0.12**	**0.08**	1.00	0.01	0.00
Non-Hispanic White						
Married [3]	−0.02	**−0.06**	**0.08**	0.49	**0.07**	**0.05**
Single/ Childless[4]	0.02	−0.07	0.05	0.87	0.01	0.02
Non-Hispanic Black						
Married [5]	−0.07	**−0.17**	**0.24**	1.38	−0.06	0.00
Single/ Childless [6]	−0.01	**−0.10**	**0.11**	0.43	−0.05	−0.08
Hispanic						
Married [7]	−0.02	**−0.17**	**0.20**	0.48	0.03	0.01
Single/ Childless [8]	0.10	**−0.23**	**0.13**	2.35	0.06	0.04

This data comes from the 1992, 1993, 1996, 2001, 2004 & 2008 SIPP panels. State-level fixed effects OLS regressions, controlling for Federal and State Earned Income Tax Credit, eligibility criteria for public health insurance coverage, state unemployment, age, (race & ethnicity for the model including all races) and year fixed-effects. We use robust standard errors, clustered at the state-level. A bold result indicates p-value<0.05 1A. N = 35,957, 1B. N = 7,464, 2A. N = 26,551, 2B. N = 5,370, 3A. N = 15,240, 3B. N = 3,159, 4A. N = 11,989, 4B. N = 2,464, 5A. N = 6,115, 5B. N = 1,255, 6A. N = 7,548, 6B. N = 1,534, 7A. N = 14,602, 7B. N = 3,053, 8A. N = 7,014, 8B. N = 1397.

models where Y_{ijt} indicated an outcome for individual **i** in state **j** in year **t** and had the following form:

$$Y_{ijt} = \beta_o + \beta_1 SINGLE_i + \beta_2 WR_{jt} + \beta_3 SINGLE_i * WR_{jt} + \beta_4 X_i + \beta_5 S_{jt} + \beta_6 FEITC_{it} + T_t + U_j + E_{ij}$$

β_0 is the intercept. β_1 is the coefficient for single mother status. β_2 is the coefficient for welfare reform implementation. β_3 is our coefficient of interest for the interaction between single mother status and welfare reform implementation, which we interpret as the impact of welfare reform on single mothers, net of secular time trends. β_4 is the coefficient for a vector of individual-level variables. β_5 is the coefficient for state-level variables. β_6 is the coefficient for the Federal Earned Income Tax Credit. T_t and U_j represent year and

state fixed-effects, respectively. E_{ijt} is the residual.

4. Results

The descriptive statistics for the single mothers, married mothers and single childless women from core wave data (Medicaid, private health insurance, uninsurance, self-reported disability) and health topical module data (annual medical provider contact and self-reported poor health) are found in Tables 2A and 2B, respectively. Forty-two percent of the population is single mothers. On average single mothers are younger (32 years vs. 35 years) than married mothers, more likely to be black (31% vs. 7%), less likely to be Latino (35% vs. 48%) and less likely to have more than one minor child (60% vs. 69%). Single mothers are less likely to

report uninsurance (24% vs. 33%), more likely to report Medicaid coverage (56% vs. 18%), less likely to report private health insurance coverage (20% vs. 49%) and more likely to report disability (17% vs. 9%). The descriptive statistics for the sample used in the health topical module analyses, did not differ appreciably from that of the sample used for the core wave analyses. On average, single mothers had higher levels of annual medical provider contact (5 vs. 4 contacts) and higher levels of self-rated poor health (22% vs. 15%) than married mothers.

4.1. Results for the impacts of welfare reform on health insurance coverage, annual medical provider contact and health outcomes of all single mothers

The regression-adjusted beta coefficients capturing the impact of welfare reform on health insurance coverage, health care utilization and health outcomes are found in Table 3. Among single mothers, relative to married mothers, welfare reform decreased the probability of uninsurance by 5 percentage points ($\beta = -0.05$; 95% CI = -0.09 to -0.01), decreased the probability of Medicaid coverage by 12 percentage points ($\beta = -0.12$; 95% CI = -0.16 to -0.09) and increased the probability of having private health insurance coverage by 17 percentage points ($\beta = 0.17$; 95% CI = 0.14 to 0.20). Among single mothers, relative to single childless women, welfare reform decreased the probability of Medicaid coverage by 12 percentage points ($\beta = -0.12$; 95% CI = -0.18 to -0.06) and increased the probability of private health insurance coverage by 8 percentage points ($\beta = 0.08$; 95% CI = 0.03 to 0.14) but had no significant association with uninsurance. There was no statistically significant relationship between welfare reform and annual medical provider contact, irrespective of the comparison group used. With respect to health outcomes, among single mothers, relative to married mothers, welfare reform led to a 2 percentage point increase in self-reported disability ($\beta = 0.02$; 95% CI = 0.00 to 0.04) but had no statistically significant impact on self-reported poor health. When the single childless woman comparison group was used, welfare reform did not have a statistically significant impact on any of the health outcomes. Sensitivity analyses with sampling weights and logistic regression models were conducted for all analyses and none of the results were appreciably altered.

4.2. Results for the impacts of welfare reform on health insurance coverage, annual medical provider contact and health outcomes of white, black and hispanic single mothers

Unlike the results generated when all single mothers were used, welfare reform led to a statistically insignificant decrease in uninsurance among single mothers relative to married mothers in all stratified analyses, likely as a consequence of reduced power due to loss of sample size. As is the case for the results among all single mothers, welfare reform had a statistically significant negative impact on Medicaid coverage and a statistically significant positive impact on private health insurance coverage. Consistent with the results derived when using all single mothers, no relationship was observed between welfare reform and annual medical provider contact. Among non-Hispanic white single mothers, welfare reform increased self-reported poor health and self-reported disability by 7 percentage points ($\beta = 0.07$; 95% CI = 0.01 to 0.12) and 5 percentage points ($\beta = 0.05$; 95% CI = 0.01 to 0.09).

5. Discussion

There has been ongoing concern that changes in the welfare program, as a consequence of welfare reform, may have led to declines in health insurance coverage, declines in health care

utilization, and worse health outcomes, among single mothers with low SES. The balance of methodologically rigorous studies have found that welfare reform has had negative implications for the health insurance coverage of single mothers with low education. While methodologically robust studies using nationally representative samples of single mothers with low levels of education have failed to link welfare reform with worse health outcomes, some methodologically rigorous but less externally valid studies have found a positive relationship between welfare reform and adverse health outcomes among former welfare recipients (Bitler et al., 2004; Jagannathan et al., 2010; Kaestner and Tarlov, 2006; Lindhorst and Mancoske, 2006; Muennig et al., 2013; Wilde et al., 2014). One general limitation of this body of work is that most studies covered a relatively short time period following the implementation of welfare reform, prior to full implementation of time limits, a key feature of welfare reform, and before welfare recipients actually started to time out.

This work sought to extend this research by examining the impact of welfare reform on health insurance coverage, medical provider contact and health outcomes, using a nationally representative data source, covering a time period after all the key features of welfare reform were implemented. Welfare reform was significantly negatively associated with Medicaid coverage and positively associated with private health insurance coverage in the majority of analyses. Welfare reform was not found to increase uninsurance among single mothers nor was it found to have an impact on annual medical provider contact. Welfare reform was found to have a positive impact on self-disability among single mothers relative to married mothers; however, this finding was driven by increases in self-reported disability among white single mothers. Welfare reform also led to an increase in self-reported poor health among white single mothers relative to married mothers. Although the direction of the relationship between welfare reform and the health outcomes remained consistent when the single childless woman comparison group was used, the findings were no longer statistically significant.

This study builds on previous work by showing that welfare reform did not increase uninsurance among single mothers when a longer time period was examined. This work also provides strong evidence of sizable shift in health insurance coverage from Medicaid coverage to private health insurance coverage in the wake of welfare reform. This study found that welfare reform was exclusively associated with increases in self-reported poor health and self-reported disability among white single mothers, relative to married mothers. These finding may be partially explained by the fact that "self-reported health" has been shown to be a more reliable and valid predictor of health outcomes in whites compared to minorities (Jylhä, 2009).

This is the first study, using a nationally representative sample, to find that there may have been adverse health impacts of welfare reform. The findings of this study suggest that the inability of prior studies to identify possible health impacts of welfare reform, in this cohort, despite robust methods and nationally representative samples, may be due to the inability to use data covering a longer time period after full implementation of welfare reform. The inability of this study to find negative impacts of welfare reform on health insurance coverage and medical provider contact, in the setting of possible adverse health impacts suggest that the mediating pathways involving financial resources and employment may play a more important role in determining the nature of the relationship between welfare reform and health outcomes relative to health insurance coverage.

Future studies should explore the relationship between welfare reform and health outcomes in more depth. Mediating pathways besides the pathway involving health insurance coverage and

health care utilization should be explored. Studies should also examine the implications of the shift from Medicaid to private health insurance coverage for quality of care. Lastly, analyses should be performed with individuals directly subject to welfare reform policies such as sanctions and time limits, as group averages may conceal pronounced health changes in these subgroups.

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