Family-friendly workplace policies in the United States: Associations with maternal and child health

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Introduction

International research shows maternity leave, especially if paid and longer than six weeks in duration, to be associated with positive health outcomes for women and infants, including lower rates of maternal depression and anxiety, lower infant mortality rates, and longer breastfeeding duration.[1-3] Despite significant potential benefits in terms of both health and cost savings, the U.S. lags far behind other countries in providing new parents with job-protected and financially supported leave after the birth of a child. While the Family and Medical Leave Act (FMLA) of 1993 requires employers to offer eligible employees up to 12 weeks of unpaid, job-protected leave each year to care for family members, many cannot afford taking extended leaves of absence without pay. In addition, FMLA only applies to employers with 50 or more employees located within a 75-mile radius from the worksite and employees who have worked at least 1,250 hours during the previous 12 months. A 2012 report by the U.S. Bureau of Labor Statistics indicated that over half (54%) of 1,812 worksites surveyed indicated being exempt from FMLA, mostly due to having fewer than 50 employees; 30% were unsure whether FMLA was applicable to them, and only 17% indicated being covered by FMLA.[4] As of 2015, only 13% of U.S. workers across the public and private sectors report having access to paid family leave, and nearly one-fourth (24%) of workers in the lowest income decile indicate having no access to either paid or unpaid leave.[5] This leaves a significant portion of employed women, especially those in lower-paying or less stable jobs, without guaranteed access to any form of maternity leave.[6-9]

Though a number studies have addressed the potential links between maternity

leave and maternal/infant health, most focus on outcomes in children, with findings on maternal physical and mental health being mixed. As a result, the evidence base for current policy efforts to expand access to maternity leave, especially in the U.S., has several limitations. Many existing studies are restricted geographically (based on a single state or non-U.S. countries) or demographically (representing only women of high socio-economic status [SES]), limiting their generalizability to the overall U.S. population. The few nationally-representative studies that currently exist were conducted using data collected over two decades ago.[10, 11] Policy developments during this period, including the passage of FMLA in 1993 and many subsequent policies passed at the state level, are likely to have influenced women's access to and experiences of maternity leave. In addition, many studies do not differentiate between paid and unpaid leave, which may affect whether women take leave at all, the length of leave that they take, and the resources available to them during leave.

The aim of this dissertation is to fill these gaps by analyzing new data from two nationally representative surveys of U.S. women. The *Listening to Mothers III* (LTM3)survey contains responses on employment, maternity leave, and postpartum health from 2,400 women ages 18-45 who delivered a singleton infant in a U.S. hospital from July 2011 to June 2012. The National Survey of Family Growth (NSFG) 2006-2010 contains detailed information on employment and maternity leave from 2,708 women who gave birth up to five years prior to the time of survey, as well as geographic data that allows for comparative analyses of access to leave across states. This dissertation examines the associations between maternity leave policies, health indicators for women and infants, and women's employment and health insurance outcomes after childbirth.

My specific aims are:

1. To determine whether the **use and duration of paid maternity leave** predicts:
    - Infant health: Overall physical health status and healthcare utilization; and
    - Maternal health: Physical and mental health status, healthcare utilization, and health-related behaviors up to 21 months postpartum.
2. To assess whether **state-level policies that expand on minimum FMLA provisions** are associated with differential access to maternity leave across states, in particular:
    - Availability of any maternity leave;
    - Use of any, unpaid, and paid maternity leave; and
    - Duration of any, unpaid, and paid maternity leave, with focus on women with public insurance (whose incomes are generally low enough to meet eligibility criteria for public insurance programs such as Medicaid).
3. To identify the associations between **employer responsiveness to requests for pregnancy-related work accommodations**, including the availability of paid and unpaid maternity leave, and:
    - Employment outcomes, including returning to the same employer and returning to paid work; and
    - Insurance outcomes, including loss of private, public, and all health insurance coverage up to 21 months postpartum.

My overall hypothesis, based on the existing literature, is that maternity leave has a significant positive association with maternal and infant health, especially when leave is paid and longer than six weeks. Job protection lowers the risks involved in taking

extended leaves of absence from work, including the risk of losing one's job, making investment into health production a less costly choice. Paid leave, additionally, mitigates any potential reduction in income.[12, 13] I also hypothesize that state-level policies have produced significant differences in access to maternity leave, again due to the reduced risk of job and/or resource loss where legal protections are in place. Finally, I expect that women whose employers are more responsive to their requests for work-related accommodations during pregnancy, including maternity leave, will be more likely to return to full-time work after giving birth, thereby minimizing any changes in employment or insurance status between the prenatal and postpartum periods. Job-protected leave allows women to return to the positions they held prior to giving birth, while perceived support from supervisors and co-workers may be associated with stronger employee retention and organizational commitment among employees.[14, 15] Remaining in the labor force not only allows women to retain the financial resources they gain from paid employment, which can then be invested into their and their children's health and wellbeing, but may also be associated with lower likelihood of depression and coronary heart disease among women.[16-18]

This dissertation capitalizes on current national datasets to produce new information on trends in maternity leave access in the U.S. and any correlations with the health of women and infants. These results are expected to be relevant not only to the over 32 million women of reproductive age in the U.S. civilian labor force and their employers, but also to policymakers interested in using research evidence to inform their decisions on policies related to maternity leave at both state and federal levels. This dissertation may also serve as the basis for further research on policies aimed at

promoting wellness through the workplace and creating work-life balance, such as family leave, paid sick leave, and accommodations for breastfeeding.

The contents of this dissertation are as follows. First, I will present a review of the existing literature pertaining to 1) the definition and scope of maternity leave; 2) the associations between maternity leave and maternal/infant health; 3) policies governing maternity and family leave, with emphasis on the U.S. context; and 4) the role of family-friendly workplace policies in women's decisions regarding paid employment after childbirth. This will be followed by an overview of the research methods I use to address the research questions in each of the three specific aims outlined above. I will then present the research studies designed around each of the three aims in the form of three separate journal manuscripts; each of these manuscripts is self-contained and is followed by a technical appendix detailing additional analytical approaches, sensitivity analysis, and discussions on study limitations. A final conclusion section will then summarize the overall thematic findings from this dissertation, implications for policy and practice, and directions for future research.

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Literature Review

Maternity leave: Definitions and scope

Maternity leave is one example of social welfare policies that define "how state activities are interlocked with the market's and the family's role in social provision."[1, 2] Parental leave, which includes both maternity and paternity leave, represents one example of family-support policies that seek to balance the interests of labor and capital, with the objective of reducing poverty, supporting employment, and promoting child welfare.[3, 4] Other similar policies include flexible work hours to accommodate new parents, the public provision of child care and early childhood development programs, and cash or tax incentives for working parents with young children.[4] While these benefits tend to be provided by regional and national governments in countries traditionally considered to follow the social-democratic model of the welfare state, including Denmark, Norway, and Sweden, among others, private actors such as employers may also play a role in their provision, especially within countries following a liberal welfare state model, including Canada, Japan, Switzerland, and the U.S.[1]

Two main features comprise parental leave: 1) time off from work with the guarantee of returning to the same or a similar position and 2) wage replacement during leave, via either direct financial compensation or employer contributions. These provisions allow new parents, especially women, to remain in the labor force after the birth or adoption of a child, thereby increasing parental employment, reducing income loss, and lowering the risk of childhood poverty.[5-7] Often, these benefits are allocated to mothers more generously than to fathers, due to traditional social structures in which

women bear primary responsibility for child bearing and child rearing.[8] Increasingly, however, countries such as Canada and Sweden have expanded parental leave benefits to fathers. [9, 10]

Internationally, maternity leave is coming to be recognized as a human right and vital form of protection for both mothers and children. The 1979 United Nations Convention on the Elimination of All Forms of Discrimination Against Women listed "the right to maternity leave with pay or with comparable social benefits without loss of former employment and seniority or social allowance" as an essential component of women's right to work.[11] In 2000, the International Labor Organization (ILO) held a Maternity Protection Convention recommending at least 14 weeks of maternity leave as a baseline provision "in order to further promote equality of all women in the workforce and the health and safety of the mother and child."[12]

Maternity leave and maternal/child health

Several large-scale studies have explored the associations between maternity leave and health, cognitive, and developmental outcomes in infants and young children within an international context. Countries that guarantee at least 50 weeks of paid maternity leave experience 12% lower infant mortality and 20% lower child mortality, and each additional week of paid maternity leave may lead to a 0.5 decrease in infant mortality per 1000 live births.[13, 14] Extending the duration of paid leave has also been associated with significant reductions in neonatal, post-neonatal, and child mortality rates.[15, 16] Smaller studies within the U.S. have found women's return to work within 12 weeks postpartum to be associated with fewer regular medical checkups for children,

lower rates of vaccination, and decreased breastfeeding initiation and duration.[17] Longer leave duration (12 versus six weeks) is also associated with lower quality of mother-infant interactions and lower levels of maternal responsiveness, sensitivity, and positive affect.[18]

Studies examining the effects of maternity leave on maternal health have been fewer, less consistent, and narrower in scope. Several smaller, regional studies in the U.S. have found associations between maternity leave and better maternal mental health. In one study of 266 Wisconsin women, those taking six weeks of leave had higher levels of depression and anger than women taking 12 weeks.[19] [19]Another found lower levels of depression and anxiety, higher life satisfaction, and greater positive affect in Minnesota women who took more than 24 weeks of leave, compared to those taking fewer than nine weeks.[20] Women in Minnesota were also found to experience a non-linear relationship between length of leave and mental health, where positive associations with role function and lowered rates of depression were strongest with shorter (3-6 months) and longer (12+ months) lengths of leave, compared to medium lengths.[21, 22] Nationally, one study used data from the 1988 National Maternal and Infant Health Survey and found an association between longer leave duration (8-12 and >12 weeks) and a 11-15% decline in maternal depressive symptoms, compared to women taking six or fewer weeks.[23]

Studies on the relationship between maternity leave and maternal physical health have been less conclusive. Whereas some have found positive associations between leave duration and overall measures of physical health and functioning, others have found no significant association between leave length and the frequency of maternal outpatient

clinic visits in the first six months postpartum, health status (self-assessment and clinical symptoms), or role function up to 12 months postpartum.[22-24] One study found little significant change in health behaviors—including diet, physical activity, and stress management—among women before and after giving birth, but did not compare women who took maternity leave to those who did not.[25] Within the existing literature, maternity physical health is often represented broadly by indicators of overall health status or mortality; the few studies that do explore specific conditions that may affect postpartum women, such as back pain or physical exhaustion, are limited by small sample sizes in non-U.S. settings.[23, 26]

Policies pertaining to maternity leave

Nearly all countries worldwide have adopted national policies guaranteeing some length of job-protected maternity leave with wage replacement. Among countries in the Organization for Economic Co-operation and Development (OECD), the United States ranks second-to-last in the amount of parental leave available to two-parent families (12 weeks per parent, or 24 weeks total), surpassing only Switzerland (7 weeks per parent, or 14 weeks total); it is also the only OECD country to have no provisions for wage replacement during maternity leave.[7] While four U.S. states have implemented paid maternity leave policies, the length of leave and level of wage replacement are lower than the OECD average of 22 full-time-equivalent weeks. California, Hawaii, and New Jersey provide up to six weeks of paid maternity leave, with wage replacement averaging 55-66% of annual wages, while Rhode Island offers four weeks of paid maternity leave with an average wage replacement rate of 4.62% of the highest quarterly wages during the past

year. No states offer 100% wage replacement or paid leave past six weeks.[27, 28] In each of these states, Temporary Disability Insurance programs that provided partial wage replacement for employees with short-term disabilities, including pregnancy, set a strong precedent for social insurance policies that later paved the way for paid family leave.[29]

Public policies that guarantee access to maternity leave have been shown to influence leave-taking behavior. Evidence from several OECD countries suggests that the timing of women's return to work postpartum corresponds closely to the length of paid maternity leave available to them.[10] In Germany, for instance, a series of leave expansion policy changes from two to six months in 1979, six to 12 months in 1988, and 12 to 18 months in 1990 saw average leave duration increase to the maximum length available in each instance.[30] In the U.S., take-up rates for unpaid maternity leave increased 23% just two years after the FMLA was implemented, and leave duration increased by six weeks on average.[31, 32] State-level laws also correspond to leave-taking behaviors. California implemented its paid family leave insurance legislation in 2004 and New Jersey in 2008. Both states have seen significant increases in the take-up rates for paid leave, with more than 1.1 million claims filed in California from 2004-2011 and 60,000 in New Jersey from 2009-2012.[29] Use of paid leave in California under the new legislation was especially prevalent among workers with lower-paid jobs ($20/hour or less) that offer no health insurance benefits; 84% of employees with such jobs took paid leave, compared to only 31% of employees with more well-compensated jobs.[33]

Workplace policies, employment, and health insurance coverage

Women's labor force participation has risen significantly over the past several decades, from 43.9% of all women ages 16 and older in 1972 to a peak of 59.9% in 2000, before declining to 57.7% in 2012. As of 2014, women comprise 47% of the U.S. labor force and nearly three-fourths (74%) of all U.S. workers in the educational and health services industries.[34] Labor force participation among women with young children (age 3 or under) follows a similar trend, nearly doubling from 34.1% in 1976 to a peak of 61.8% in 1997, before declining to 60.7% as of 2012.[35, 36] Evidence suggests that women who recently gave birth are significantly more likely to exit the labor force compared to demographically similar women, and those who do return to employment are more likely to work reduced hours compared both to others and to their own pre-pregnancy hours.[37, 38] Women who do return to work postpartum often experience a reduction in wages even when they assume the same positions they held prior to giving birth, often due to wage concessions made in exchange for job flexibility.[39]

One potential contributing factor to women's employment status after childbirth is employer support in the form of family-friendly workplace policies. A number of studies have documented the influence of maternity leave availability on women's employment outcomes after giving birth. Policies providing paid maternity leave were associated with a 3-4% increase in female employment rates in nine European countries from the years 1969-93, regardless of leave length, indicating that formal leave policies facilitate better job continuity.[40] Another study found access to paid leave to be associated with return to work in Norway and Sweden, but that women who had access to shorter lengths of leave

were more likely to exit the labor force, suggesting that leave duration may have a significant association with return to work.[41]

Several U.S.-based studies have also established the links between maternity leave and employment. Women who have access to paid maternity leave have been found to be more likely to work later into their pregnancies and to return to work within a year after giving birth.[42, 43] Some evidence suggests also women's anticipation of workplace support, as well as reductions in mandatory working hours, to be associated with employee retention and return to work postpartum.[44, 45] However, most research on family-friendly work environments focus mainly on policies during the postpartum period, such as flexible work hours and child care arrangements.[46, 47] To date, no known studies have addressed the potential associations between employer accommodations during pregnancy—including the anticipation of maternity leave availability, which may affect women's plans for returning to work postpartum—and changes in women's employment and health insurance status after giving birth.

Within the U.S., access to workplace accommodations for pregnancy-related conditions may be difficult to come by, especially for lower-income women and families. In their review of access to family-friendly workplace policies, Kossek et al. (2008) reported only 3-5% of all U.S. employees as having access to flexible work arrangements, i.e., being able to work from home during part of the workweek. Only 34% of employers allow some employees to change the start or end time of their workdays on a regular basis, while 33% allowed employees a periodic schedule change (e.g., to accommodate childcare arrangements or doctor's appointments). These accommodations,

which are significantly associated with job satisfaction, employee retention, reduced absenteeism, and increased productivity, are also significantly less likely to be available to lower-income and non-union workers.[48] As a result, women with lower-income or non-professional/managerial jobs may be more vulnerable to involuntary changes in employment status after giving birth and thereby at higher risk of either insurance churning or uninsurance postpartum.[46]

Addressing research gaps

This dissertation is aimed at addressing several of the research gaps identified in the literature review above. Across all three aims, the use of nationally-representative data from within the past decade will produce more up-to-date, widely generalizable evidence on the associations between maternity leave policies, leave access, maternal/child health, and women's employment and insurance. Given the increased policy activity around maternity leave and work-life balance during the past decade, especially after the implementation of the FMLA, updated information based on newer, more generalizable data can provide policymakers, employers, and women alike with better evidence on which to base their decisions regarding the provision and use of paid and unpaid maternity leave. In addition, this dissertation evaluates state-level policies pertaining to maternity leave in a comparative context across U.S. states, which no research to date has addressed. These results may shed light on the role that various types of policy expansions on FMLA may play in promoting women's access to paid and unpaid maternity leave, providing decision-makers with important information on the potential impact of expanding these policies from state to federal levels.

With regard to Aim 1, the proposed analysis addresses the limitations of the existing literature in two main ways. First, regarding data availability and quality, the LTM3 survey provides a more demographically and socioeconomically diverse sample than the datasets used in previous studies on maternity leave and health, which were conducted predominantly among well-educated, non-Hispanic white women who were either married or partnered. The LTM3 sample population is more reflective of the overall demographic and socioeconomic composition of U.S. women of childbearing age. In particular, 45% of survey respondents belong to minority racial/ethnic groups, with 23% identifying as Hispanic; 15% as non-Hispanic black; and 7% as Asian, American Indian/Alaskan Native, multiple race, or other. Forty-two percent of respondents listed high school or less as their highest level of education obtained; 29% had attended some college, and 30% had college and/or post-graduate degrees (all percentages weighted). Both of these demographic distributions closely mirror the national population of women in the U.S. who are of childbearing age, as reflected in the CDC's Vital and Health Statistics natality data from 2010.[49]

In addition, the LTM3 surveys contain more detailed health-related outcomes for women and infants, including measures of healthcare utilization (number of well- and sick-child clinic visits for infants, overnight hospitalizations for mothers and infants, and visits to mental health professionals since birth), detailed indicators for maternal physical and mental health, and measures of health-related behaviors that may impact women's health in the longer run, including nutrition, physical activity, stress management, and sleep. Being able to examine these outcomes will provide a fuller picture of the potential

impact that maternity leave may have on women's health in particular, given that potential associations between leave and health conditions and/or status may not manifest until later in time. For example, women taking paid leave or longer lengths of leave may have more time and resources to invest in healthy behaviors such as physical activity and adequate sleep, which in turn may help them avoid chronic conditions such as cardiovascular disease, diabetes, and obesity if maintained in the longer term. Secondly, the proposed analyses will build on the existing literature by focusing specifically on paid maternity leave, which is the focus of current policy discussions and legislative proposals in the U.S., including the Family and Medical Insurance Leave (FAMILY) Act (S.1810 / H.R.3712), which proposes a federal program providing eligible employees with up to 12 weeks of paid leave to care for family members. Making a clear distinction between paid and unpaid leave can help policymakers evaluate the costs and benefits of paid leave policies, such as those passed at the state level in California and New Jersey.

For Aim 2, one main contribution of the proposed analysis is the assessment of state-level maternity leave policies in a comparative context. Given the number of states that have adopted leave policies that are more generous than those stipulated by the FMLA, comparing maternity leave availability, use, and duration across states can help policymakers evaluate their potential impact on access to leave, identify any sub-groups that may benefit in particular from these policies, and determine whether such policies are necessary to ensure better access to maternity leave for women of all socioeconomic and demographic backgrounds. In addition, this study will examine the potential impact of not only paid leave policies, which have been the subject of several studies both in the

U.S. and internationally, but also policies that expand access to the unpaid leave provided under FMLA and those that extend the minimum length of job-protected leave. This can help researchers, employers, and policymakers alike consider the potential consequences of leave-related legislation in terms of the impact they have on women's time and resources, and any subsequent associations with maternal and child health. Finally, the analyses for Aim 2 will benefit from some of the same data-related advantages as those that apply to Aim 1. The NSFG 2006-2010 is a nationally-representative, relatively new dataset that has rarely been used to examine issues related to women's work and maternity leave, and while the survey does not contain detailed information on the health status and healthcare utilization of respondents and their children, its larger sample size allows for cross-state comparisons of women's access to maternity leave. In particular, the survey contains direct questions about women's employment status during pregnancy and after giving birth, whether maternity leave was offered by the respondents' employers, and whether the respondents took paid and unpaid maternity leave and for how long. This improves upon earlier studies that inferred maternity leave length using the employment status of female respondents in successive survey waves, which can be imprecise depending on the amount of time that lapses between surveys.

With Aim 3, the proposed analyses build on the existing research in two main ways. First, the LTM3 dataset contains detailed information on the specific accommodations that were requested and granted by respondents' employers during pregnancy. These variables can measure the level of support provided by employers to female employees before and after childbirth more precisely than the measures used in

previous studies, which were often based solely on women's perceptions of social support from colleagues and supervisors. Secondly, this study will examine the associations between workplace policies and not only employment outcomes, but also insurance coverage for women after giving birth. Approximately 45% of births in the U.S. are paid for by Medicaid, and their Medicaid eligibility is based on pregnancy status, which ends 60 days after delivery for women with incomes above 133% of the Federal Poverty Level.[48] As such, the number of women who lose Medicaid coverage 60 days after giving birth likely approaches one million women each year. Exploring the trends in insurance coverage from pregnancy to childbirth, through the postpartum period, can help identify gaps in insurance coverage that may be targeted for policy intervention. Moreover, given the importance of health insurance coverage in allowing women to access care for themselves and their infants after childbirth, examining the potential associations between workplace policies, insurance coverage for women who have recently given birth, and health-related maternal/child outcomes can provide a basis for both additional research and potential policies centered on insurance coverage and churning for women around the time of childbirth.

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Overview of Methods

Conceptual framework

The theoretical framework for this dissertation is based on Becker's (1965) and Grossman's (1972) models for time allocation and the production of health, wherein women will seek a balance of inputs in terms of time and income that maximizes their utility or happiness in terms of health.[1-3] Becker proposes that individuals, especially in high-income countries, may choose to forgo money income in exchange for "psychic" income, e.g., by choosing a lower-paying but more satisfying job or by taking more leisure time. Grossman builds on Becker's theory of time allocation by proposing a specific model of demand for health capital, which posits that optimal health stock is determined by the marginal efficiency of health capital plus the cost of gross investment. Taken together, these models illustrate the potential associations between maternity leave and maternal/infant health, in that a woman will choose to invest in health production for herself and her infant when the cost of time and forgone income are sufficiently low, and she will maximize her utility by having more time for recovery from childbirth and to bond with and care for her infant (and potentially also other children in the family).

Job-protected leave lowers the cost of taking time off work by reducing the risk of future unemployment when women are ready to return to work, while paid maternity leave directly reduces financial loss, thereby allowing women to make greater investments into the health of herself and her child. In addition, job-protected leave allows women to return to the same or a similar position at work after her leave ends, while workplace accommodations during pregnancy such as more frequent breaks or

reduced heavy lifting may play a role in allowing women to retain their jobs during pregnancy; both can affect women's ability and motivation to return to work postpartum. Because over one-third of U.S. women have health insurance through their employers,[4] return to work can determine health insurance coverage status for postpartum women, which in turn determines in part the extent to which women have access to health care services; this then contributes to maternal physical and mental health status and healthcare utilization, and subsequently to women's ability to invest in the health of their infants. This model, which draws on the work of both Becker and Grossman, has been successfully applied to the *Listening to Mothers II* dataset to examine the relationship between women's workforce participation and perinatal health.[5, 6] Figure 1 shows the complete conceptual model for all three aims, while Figures 2, 3, and 4 show the parts of the conceptual model relevant to Aims 1, 2, and 3, respectively.

Figure 1. Complete conceptual model

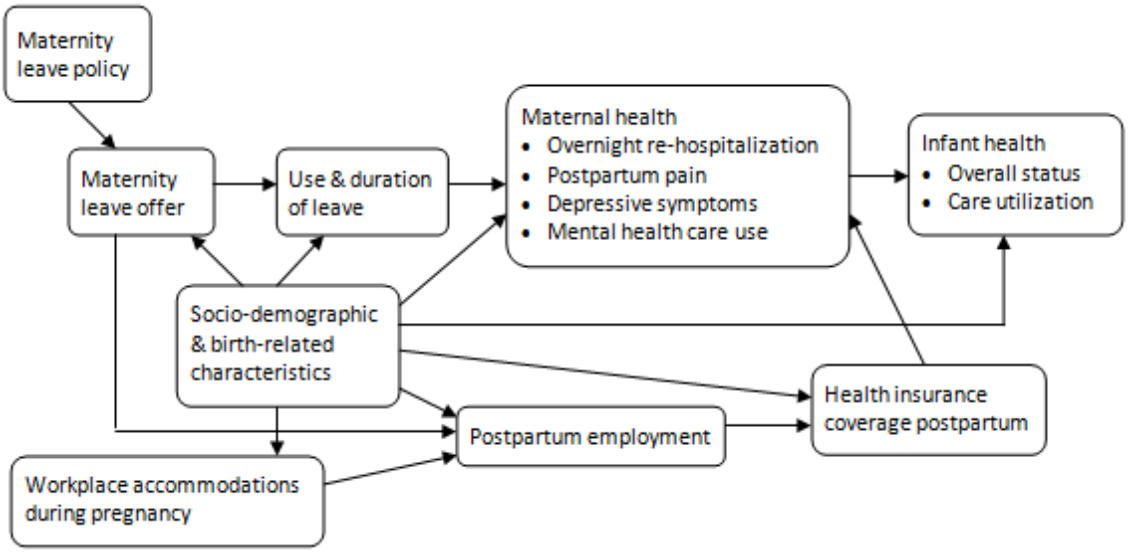


Figure 2. Conceptual model for Aim 1

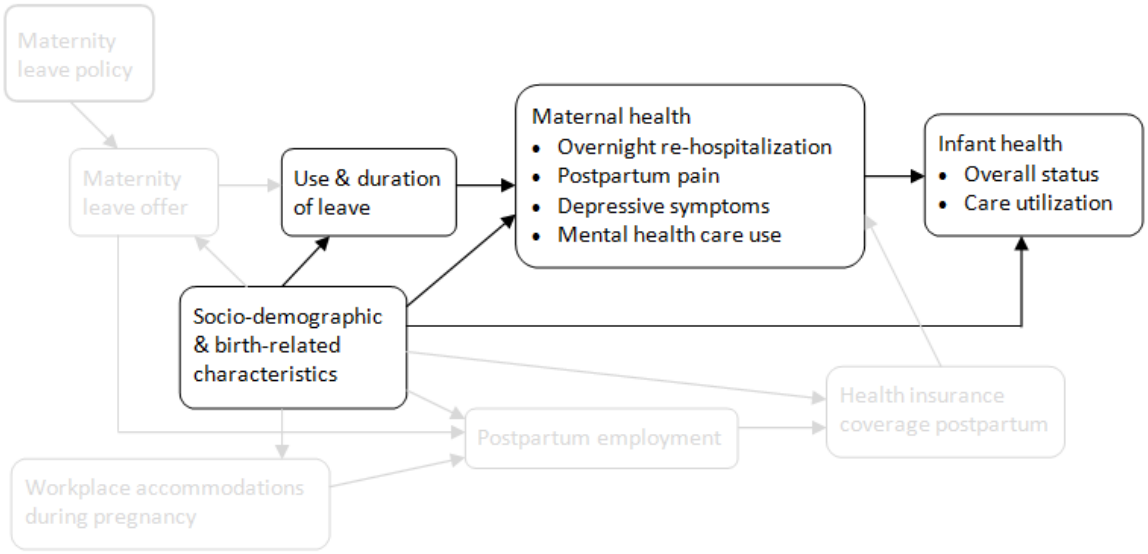


Figure 3. Conceptual model for Aim 2

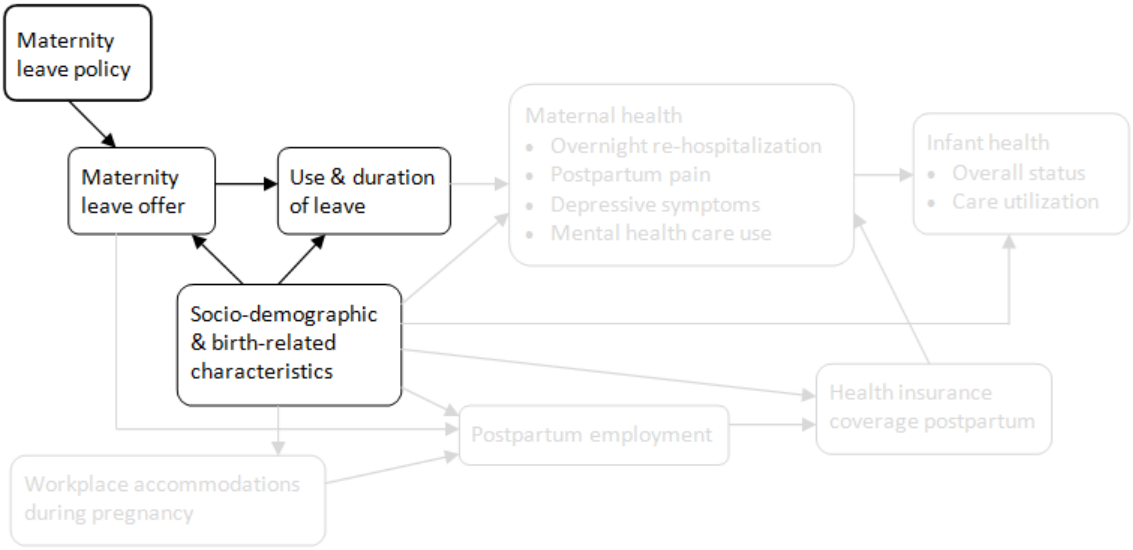
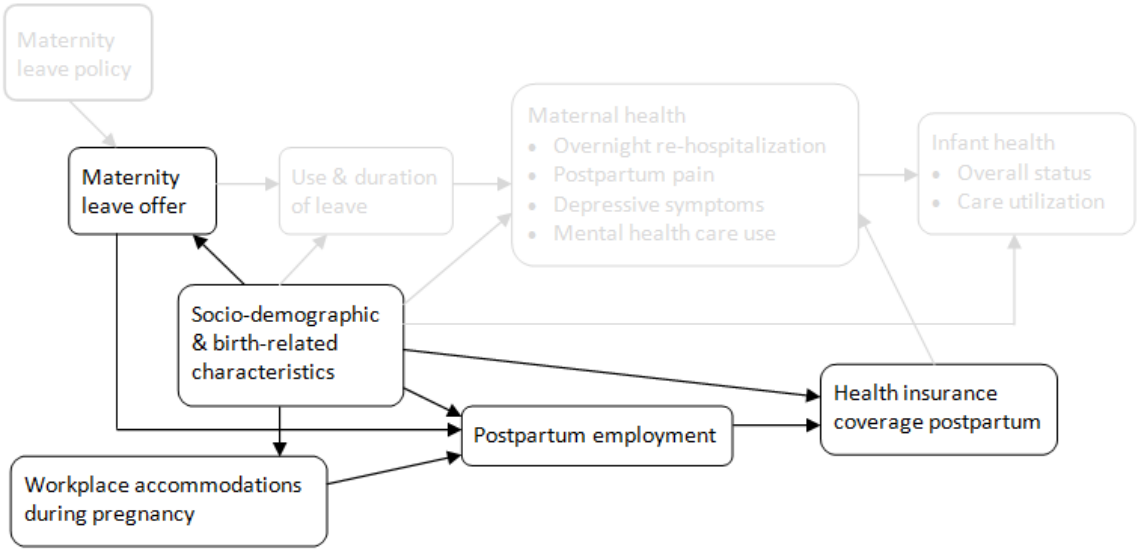


Figure 4. Conceptual model for Aim 3



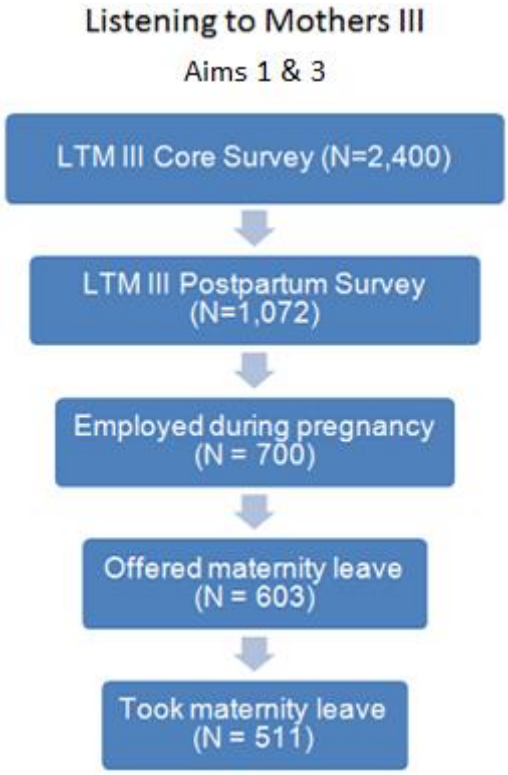
Aim 1. Study data & analytical approach

The data for Aims 1 and 3 are from LTM3, a nationally-representative panel survey of women ages 18-45 who delivered a singleton infant in a U.S. hospital between July 2011 and June 2012. The survey consists of: 1) the initial core survey, administered from October 11th to December 26th, 2012 via internet (N=2,400), and 2) a follow-up postpartum survey conducted from January 29th to April 15, 2013 (N=1,072). This aim uses data only from respondents who completed both the initial core and the postpartum surveys, the latter of which contains all employment- and leave-related questions. Participants were recruited by Harris International, an internationally-recognized survey research company, using sampling and weighting strategies designed to obtain a study sample representative of the national population of U.S. women who gave birth in 2011-2012; these strategies have been validated and reported in previous studies.[7, 8] The

resulting data are de-identified and are publicly available for research through the Odom Institute for Research in Social Science at the University of North Carolina, Chapel Hill.

The study population for Aim 1 consists of 700 women who worked full- or part-time for an external employer during pregnancy. Of these 700 women, 603 (86%) had leave available, and 511 (73%) took either paid or unpaid maternity leave (Figure 5). The main predictors of interest include 1) use of paid maternity leave, compared to use of no leave and use of unpaid leave only; and 2) duration of paid maternity leave in weeks, with 0 weeks as the comparison group. The main outcomes of interest include 1) infant health status and health care utilization, and 2) maternal health care utilization, mental health, and health-related behaviors. One- and two-way tabulation with design-based F-tests are used to describe sample characteristics and identify socio-demographic differences in access to paid maternity leave. A series of logistic regression models is then used to predict each of the health outcomes of interest, with propensity score matching applied in order to offset potential selection bias.

Figure 5. Study population, Listening to Mothers III (Aims 1 & 3)



Aim 2. Study data & analytical approach

For Aim 2, data are from the NSFG 2006-2010, a national survey of men and women in the U.S. on factors influencing birth rate trends, including family planning, sexual activity, contraceptive use, and attitudes and behaviors regarding marriage and childbearing. Commissioned by the Centers for Disease Control and Prevention (CDC) and administered via in-person household interviews by the University of Michigan's Institute for Social Research, the NSFG 2006-2010 is the seventh survey wave conducted since 1973. Public use data files and documentation are available from the CDC, while geographic variables—including state- and county-level residence data for each

respondent—are available from the National Center for Health Statistics (NCHS) via the Census Bureau's Research Data Centers (RDCs), which are accessible to researchers with Special Sworn Status .[9] NSFG 2006-2010 contains a pregnancy supplement that includes responses from 20,492 individuals about their and their partners' experiences during and after pregnancy. While the raw geographic data were not released in order to protect respondents' privacy, I worked with the NCHS analyst assigned to this project to create anonymized, collapsed versions of the restricted variables (further details in Aim 2). These abridged variables, along with the full data from the pregnancy supplement, were made available to me by the NCHS through the University of Minnesota RDC.

The study population for Aim 2 consisted of 2,708 women who were employed during their pregnancies and fit this study's eligibility criteria (gave birth to a live singleton infant in a U.S. hospital no more than five years prior to the survey). Of these women, 2,496 (92%) had maternity leave available, and 1,722 (64%) took some length of paid or unpaid leave (Figure 6). The main predictor of interest was the type of state-level maternity leave policy in effect within each respondent's state of residence at the time she gave birth. Main outcomes of interest included maternity leave availability, use, and duration, differentiating between paid and unpaid leave when possible. Sample characteristics were tabulated using one-way tabulation. Logistic regression models were then used to predict the availability and use of maternity leave by state-level policy, as the policies were not mutually exclusive and represented by a series of separate dichotomous variables indicating whether each policy was in effect in the respondents' state of residence at the time of childbirth. Multinomial logit models were then used to

predict leave duration, which was represented by 4-category variables (0, 1-6, 7-12, and more than 12 weeks of leave) for any, paid, and unpaid leave; categorical variables, rather than continuous, were used due to literature suggesting a non-linear relationship between leave duration and health. To determine the differences in policy impact by socioeconomic status, each of the regression models was run with an interaction term between state policy and public insurance coverage.

Figure 6. Study population for National Survey of Family Growth 2006-10 (Aim 2)

Aim 3. Study data & analytical approach

The data source and study population for Aim 3 is the same as in Aim 1, i.e., the 700 respondents in the LTM3 survey who indicated having worked part- or full-time

during their pregnancies (Figure 5). Two measures of workplace policy were included as the main predictors: whether employers met all requests for pregnancy-related accommodations by each respondent, and whether maternity leave (paid and unpaid) was available. The main employment outcomes were returning to any paid work and returning to the same employer by the time of survey, while the main insurance outcomes included loss of private, public, and all insurance (i.e. becoming uninsured) between the time of childbirth and time of survey.

Two-way tabulation with design-based F-tests were used to identify differences in access to workplace benefits. Each of the two employment outcomes was then regressed on the workplace accommodation variables, and the insurance outcomes regressed on the employment outcomes. Covariates included age, race/ethnicity, education, household income, Census region, marital status, mode of delivery, maternal health pre-pregnancy, and number of months since the respondent gave birth, Full logistic models were run to predict the likelihood of each insurance outcome by workplace policies, with and without the employment outcomes that were found to be significantly associated with workplace policies in order to determine the extent to which employment outcomes mediated or moderated the associations between workplace policy and insurance outcomes.

All analyses in each of the three aims was weighted for representativeness and conducted using Stata 11.0.

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Aim 1. Paid maternity leave in the United States: Associations with maternal and infant health

Abstract

Objectives. The U.S. is unique in failing to guarantee paid leave to employed women who give birth. We examined the associations between paid maternity leave and maternal/infant health.

Methods. Data from *Listening to Mothers III*, a national survey of women ages 18-45 who gave birth in 2011-12, were used to conduct multivariate logistic regression predicting the likelihood of infant health, maternal physical/mental health, and maternal health behavior outcomes by use and duration of paid maternity leave.

Results. Women who took paid maternity leave experienced a 47% decrease in the odds of re-hospitalizing their infants (95% CI=0.3, 1.0) and a 51% decrease in the odds of being re-hospitalized themselves (95% CI=0.3, 0.9), compared to women taking no paid leave. They also had 1.8 times the odds of doing well with exercise (95% CI=1.1, 3.0) and stress management (95% CI=1.1, 2.8), compared to women taking only unpaid leave.

Conclusions. Paid maternity leave significantly predicts lower odds of maternal/infant care utilization and higher odds of healthy maternal behaviors. Policies expanding access to paid leave may contribute toward reducing socio-demographic disparities in paid leave use and its associated health benefits.

Introduction

Labor force participation in the United States has increased significantly over the past four decades among women with young children, nearly doubling from 34% in 1976 to 61% in 2012.[1, 2] Maternal employment may contribute positively to maternal and child health by improving the physical and mental health of women, as well as preventing the loss of wages and health insurance coverage after childbirth.[3, 4] Due to competing demands from work and family, however, many women face barriers in returning to paid work postpartum, creating persistent gender inequalities in career trajectory and income.[5, 6] This may in turn reduce the amount of resources women have available to invest in the production of their own and their children's health.[7]

One potential strategy for improving labor and health outcomes among reproductive-age women is to ensure new mothers access to paid maternity leave. Paid leave allows women time to recover physically from childbirth and to care for their infants without the risk of losing employment or income. All but three countries in the world have implemented national paid maternity leave policies: Papua New Guinea, Suriname, and the United States.[8] In the U.S., access to any maternity leave is guaranteed only through the Family and Medical Leave Act (FMLA) of 1993, which requires large employers to provide eligible employees with 12 weeks of unpaid, job-protected leave each year for qualified medical or family reasons, including caring for newborn children.[9, 10]

Many U.S. workers, however, do not meet the eligibility criteria for the FMLA, which applies only to employers with more than 50 employees and employees who

worked at least 1,250 hours during the previous 12 months.[10] Moreover, the FMLA does not include provisions for paid leave. In 2015, only 13% of all U.S. workers reported having paid family leave available, and 12% had neither paid nor unpaid family leave. Compared to family leave, which includes less commonly available benefits such as paid paternity or paid sick leave, access to paid maternity leave is somewhat more widespread, with availability estimates ranging from 21% to 58% among employed U.S. women of childbearing age.[11, 12] The latter figure, however, includes disability leave used for childbirth-related conditions. While this reflects the lived experience of many women, who, in lieu of dedicated maternity leave benefits, may be forced to "cobble together" any accrued vacation time, sick days, or disability leave they have available, the lack of formal policies regarding maternity leave specifically – and paid maternity leave in particular – not only highlights the U.S. as an international outlier, but may also have disproportionate impact on socio-demographically disadvantaged groups. Access to family and maternity leave varies across socio-demographic lines, leaving those in the service and production/transportation industries, part-time employees, low-income workers, and individuals of color particularly vulnerable.[11, 13] Even when unpaid maternity leave is available, many women may not be able to afford taking extended leaves of absence from work without pay. Over 2.8 million U.S. employees refrained from taking needed family or medical leave in 1999-2000 due to economic concerns.[10]

A growing body of literature indicates positive associations between maternity leave and infant health, including reductions in neonatal and child mortality, low birth weight, and premature birth; improved developmental outcomes; and longer

breastfeeding duration.[14-16] Some maternal health benefits are also associated with paid leave, including lower likelihood of exhibiting depressive symptoms or psychological distress.[17, 18] Evidence on maternal physical health in the U.S. context, however, is more limited. One study of California women found a 6-week increase in paid leave availability to be associated with improvements in self-rated health; others, however, have found no association between maternity leave duration and backache, sleep deprivation, number of clinic visits, or overall health status.[19-21]

Several significant limitations remain in the current research on paid maternity leave and maternal/infant health. Few studies distinguish between paid and unpaid leave, which can affect the length of leave taken and the resources available to parents while on leave. In addition, the generalizability of existing findings is limited, with most studies focusing only on smaller, regional areas or specific demographic groups. The few nationally-representative studies that exist were largely conducted using data collected over two decades ago.[17, 22] Policy developments since, including the passage of the FMLA in 1993 and many subsequent state-level policy changes, have likely influenced women's access to and experiences of maternity leave.

This study examines the association of paid maternity leave use and duration with maternal and infant health, using data from a national survey of women who gave birth in 2011-2012. Our findings may help inform decisions by state- and federal-level policymakers, especially given the recent re-introduction of a federal-level program supporting paid family leave to the U.S. Congress: the Family and Medical Insurance Leave (FAMILY) Act (S.1810 / H.R.3712), under which joint payroll contributions

would be used to fund up to 12 weeks of paid family leave.[23] These results are also expected to be of interest to city and state policymakers considering the adoption of paid family leave policies, as San Francisco and the state of New York have recently done;[24] employers seeking to balance the costs and benefits of providing maternity leave benefits; and nearly 2.5 million employed American women who give birth each year.[22]

Study Data and Methods

Data and study population

This study uses data from *Listening to Mothers III* (LTM3), a national survey of women ages 18-45 who gave birth to a singleton infant in a U.S. hospital from July 2011 to June 2012 (N=2,400). Commissioned by Childbirth Connection and administered by Harris Interactive, a leading market research firm, the survey consisted of two waves: the core survey, fielded between October and December 2012 via internet (N=2,400), and a follow-up survey administered in January – April 2013 (N=1,072). Questions in the core survey address prenatal care, choice of provider, and experiences during childbirth, while the follow-up survey contains questions about the postpartum health of respondents and their infants, as well as their experiences with employment and maternity leave before and after giving birth.

Respondents were drawn from four of Harris's ongoing survey panels—the Harris Poll Online, Research Now/E-Rewards, GMI, and Offerwise Hispanic panels—and screened for eligibility. A probability-based quota sampling method was then used to recruit participants based on the eligibility criteria detailed above until a nationally

representative base sample was obtained.[25] Participants were instructed to complete the web-based core survey; those who did so were subsequently invited to complete the web-based follow-up survey at least three months after they completed the initial core survey. To account for any potential biases associated with internet use or the likelihood of responding to the follow-up survey, propensity score weighting was applied to the dataset, along with weighting for demographic variables such as age, race/ethnicity, geographic region, educational attainment, and household income to more accurately reflect the target population. Women were excluded from our study sample if they did not complete the follow-up survey or did not report being employed during pregnancy. The final sample consisted of all 700 women who indicated in the follow-up survey that they were working part- or full-time during pregnancy.

Measurement

The two primary predictors were the use and duration of paid maternity leave. All respondents taking the follow-up survey were asked, "Did the employer you worked for during your pregnancy have a paid maternity leave benefit?", with answer choices being, "Yes, but I didn't take any paid leave"; "Yes, and I took paid leave"; "No, my employer did not have such a policy"; and "Not sure." Separately, they were also asked whether their employer had an unpaid maternity leave benefit, with the answer choices being the same. Those answering "Yes, and I took paid leave" and "Yes, I took unpaid leave" were categorized as having taken paid and unpaid maternity leave, respectively, while all other respondents were considered to not have taken paid/unpaid leave. To represent paid leave use, we constructed a dummy variable indicating whether respondents took paid

maternity leave (either alone or in combination with unpaid leave) or not (i.e., taking either unpaid leave only or no leave at all). Another dummy variable was created to compare respondents who took partially- or fully-paid leave to those who took unpaid leave only.[1]

Due to evidence suggesting a non-linear relationship between maternity leave duration and maternal health,[26, 27] we coded paid leave duration as a 4-category variable from an open-ended question asking respondents, "For how many weeks did you receive paid leave?" Responses were categorized as "0 weeks," "1-6 weeks," 7-12 weeks," and "More than 12 weeks" of paid leave use, with cutoff points based on the distribution of observations and policy considerations. Women who indicated taking no paid leave were included in the "0 weeks" category.

Four infant health outcomes were of interest: overall health status, re-hospitalization since birth, well-child visits, and sick-child visits. With regard to health status, respondents were asked "Overall, how would you rate the health of your baby?", with responses ranging from "Poor" to "Excellent" on a 4-point Likert scale. This was condensed into a dichotomous variable indicating whether infants were considered in "Excellent" health. Re-hospitalization was coded directly from a survey question asking whether the respondent's newborn had had a medical problem causing an overnight hospital stay since birth. Respondents were also asked the number of "…'well' and 'sick' visits [their child had] had at a health care provider's office or clinic" since birth. For well-child visits, we created a dummy variable indicating whether the minimum number

[1] Due to the FMLA, we view unpaid maternity leave as the status quo in terms of policy, and thus as a suitable basis of comparison for a potential new policy (paid maternity leave).

of visits by age recommended by the American Academy of Pediatrics (AAP) was met.[28] For sick-child visits, the number of visits was divided by the child's age in months, and a dummy variable was created indicating whether or not the number of sick-child visits by age exceeded the distributional median.

Indicators for maternal health included re-hospitalization, physical pain, depressive symptoms, and use of mental health care. The two indicators for physical health were coded from a yes/no question on re-hospitalization since giving birth and another on whether pain interfered with routine activities in the first two months postpartum. Maternal mental health measures included a dichotomous variable indicating whether respondents saw a mental health professional at any point after childbirth and another representing depressive symptoms; for the latter, respondents were coded as having depressive symptoms if they indicated feeling "little interest or pleasure in doing things" or "down, depressed, or hopeless" either "More than half the days" or "Nearly every day" during the two weeks prior to the survey.

Four outcome indicators for maternal health behaviors were coded from a single question asking whether respondents, "Thinking about the past two weeks, how well do you think you are doing with each of the following? 1) Getting enough exercise; 2) Eating a healthy diet; 3) Managing stress; and 4) Getting enough sleep." Responses were given on a five-item Likert scale from 1 "Not at all well" to 5 "Extremely well," which were then collapsed into dummy variables indicating whether or not the respondent was doing "Very"/"Extremely" well (4 or 5 on the Likert scale) for each of the four behaviors.

Covariates included age, race/ethnicity, level of education, household income, Census region, marital status, mode of delivery, parity, pregnancy complexity, low birthweight, and number of months since birth. Income is represented by a 3-category variable, with cutoff points determined by distributional tertiles.[2] Pregnancy complexity refers to respondents who, prior to becoming pregnant, had been obese (Body Mass Index ≥ 30 kg/m^2), taking medication for depression or high blood pressure, or diagnosed with Type 1 or Type 2 diabetes. Number of months since childbirth ranged from 7-21 months.

Analysis

One-way tabulation was used to describe the distribution of paid maternity leave use and duration, as well as maternal and infant health outcomes, while two-way tabulation with design-based F-tests was used to evaluate the association of socio-demographic and birth-related characteristics with paid leave use and duration. We then used logistic and multinomial logit regression models to estimate the likelihood of each maternal and infant health outcome, as predicted by paid leave use and duration. To address potential selection bias, we applied propensity score weights to each regression model. Propensity scores for the main exposures of interest (use and duration of paid maternity leave) were estimated based on factors expected or demonstrated to differ by exposure, including age, household income, full-time (versus part-time) work status, share of child care responsibilities with a partner (equal vs. unequal share), and whether the respondent's employer met the respondent's needs for pregnancy-related

[2] The original, continuous household income variable had 28 missing observations. We used stochastic hot deck methods to impute values for these observations, based on the following donor characteristics: level of education, employment status during pregnancy, and marital status at the time of childbirth. The imputed values were then used to create the final 3-category income variable.

accommodations prior to birth.[3] Weights were then created by taking the inverse of the propensity scores. All regression models were run using both the propensity score weights and the original survey weights to determine whether the results differed significantly due to selection based on observed variables. All regression models were adjusted for the covariates described above. None of the variables included in the analyses contained missing responses. All analyses were conducted using Stata 11.2 (StataCorp).

Results

Of the 700 women in the study population, 50% took fully- or partially-paid maternity leave, nearly 21% took unpaid leave only, and 30% took no leave (Table 1). Over three-fourths (77%) of the respondents rated their infants as being in excellent health. Prevalence of overnight re-hospitalization was similar for both respondents (12%) and their infants (10%). Around 30-40% of women rated themselves as doing very or extremely well with each of the four health-related behaviors, with adequate sleep (29%) being the least common and stress management (38%) being the most. Leave use differed significantly by race/ethnicity and income (Table 2), with fewer non-Hispanic black women taking either paid or unpaid leave (p=0.042) and fewer lower- and middle-income women taking paid leave (p=0.028). Leave duration varied by age and income, with

[3] Employer responsiveness to requests for pregnancy-related accommodation was measured using a series of survey questions asking whether respondents needed, requested, and were granted the following types of workplace accommodations during pregnancy: 1) "A change in duties, such as less lifting or more sitting," 2) "More frequent breaks, such as extra bathroom breaks," 3) "A change in your schedule or more time off, for example, to see your prenatal care providers," and 4) "Some other type of workplace adjustment due to a pregnancy-related condition." Respondents were considered to have unmet need if they indicated needing and their employers subsequently failing to address any of the four accommodation types.

shorter lengths of paid leave more common among younger (p=0.003) and lower-income (p=0.013) women.

Maternity leave use significantly predicted both infant and maternal health outcomes (Table 3). Women who took partially- or fully-paid leave experienced a nearly 50% reduction in the odds of having had their infants hospitalized (AOR, 0.53; 95% CI, 0.3-1.0), having been hospitalized themselves (AOR, 0.49; 95% CI, 0.3-0.9), and having seen a mental health care provider (AOR, 0.53; 95% CI, 0.3-0.9) since childbirth, compared to women who did not take paid maternity leave. Compared to women who took unpaid leave only, women taking paid leave had 1.76 times the odds of reporting themselves as doing very or extremely well with exercise (95% CI, 1.05-2.98) and stress management (AOR, 1.78; 95% CI, 1.14-2.79) during the two weeks prior to the survey.

Health outcomes also differed significantly by the duration of paid leave used (Table 4). Women who took more than 12 weeks of leave saw a nearly 75% decrease in the odds of having had their infant re-hospitalized (AOR, 0.26; 95% CI, 0.1-0.9) and having seen a mental health professional (AOR, 0.28; 95% CI, 0.1-1.0) since giving birth, compared to women who took no paid leave. No significant differences were found between women taking 12 or fewer weeks and those taking 0 weeks of paid maternity leave.

Discussion

Our analysis indicates that use and duration of paid maternity leave is associated with positive indicators of maternal and infant health, including lower likelihood of

maternal and infant re-hospitalization and mental health care use. This supports previous findings showing maternity leave to be associated with related outcomes such as decreased infant mortality and improved maternal vitality and life satisfaction.[14, 15, 29] By differentiating between paid and unpaid leave, however, we highlight the unique benefits that paid maternity leave may have for maternal and infant health. In addition, we find paid leave use to be associated with higher likelihood of positive health behaviors such as exercise and stress management when compared to the use of unpaid-only maternity leave. While previous studies have found no significant change in health behaviors among women pre- and post-partum,[30] ours is among the first to explore the association between maternity leave and health behaviors during the perinatal period.

Our analysis also finds paid leave in excess of 12 weeks to be associated with lower likelihood of infant re-hospitalization and maternal mental health care use. It is important to note that the latter finding does not differentiate between respondents who needed less mental health care and those forgoing needed care, making it difficult to draw definitive conclusions about the relationship between paid leave and mental health status. While lower odds of mental health care use may be due to lack of access to mental health services, women who took more than 12 weeks of paid leave tended overwhelmingly to be in the highest income category, making financial constraints a less likely barrier to mental health care use in this group. Apart from a genuinely decreased need for mental health care, another potential explanation for this finding may be that women with higher-income positions have more workplace responsibilities that prevent them from taking the time needed to see a mental health care professional. Given the lack of any

significant associations between paid leave and the likelihood of exhibiting depressive symptoms, our findings do not contradict the existing evidence on the benefits of longer leave duration for maternal mental health.[22] Because the proportion of women who took more than 12 weeks of paid leave was relatively small (3.1%), it is difficult to draw any definitive conclusion about the associations between longer lengths of paid maternity leave and maternal/infant health without further study using a larger sample population.

These findings have potentially important implications for policy, especially as paid family and sick leave are increasingly prioritized on state and national policy agendas. President Barack Obama, in his 2015 State of the Union address, singled out the U.S. as "the only advanced country on Earth that doesn't guarantee paid sick leave or paid maternity leave to our workers" and called for both "new action to help states adopt paid leave laws" and "a bill that gives every worker in America the opportunity to earn seven days of paid sick leave."[31] This study provides current, empirical evidence of the significant associations between paid maternity leave and positive indicators for maternal and infant health in the U.S., which unpaid leave alone may not provide. Paid maternity leave may also generate health care cost savings, especially with regard to re-hospitalizations. Each instance of maternal re-hospitalization adds $1,700-3,000 to the costs of birth on average, and for pre-term infants, the average annual costs of re-hospitalization exceed $40 million nationally.[32, 33] Building on research from other countries that have adopted paid leave policies, these findings highlight the importance of considering policies and incentives aimed at increasing women's access to paid maternity leave.

Such policies may also reduce the disparities in maternity leave use documented in this study. At 71% and 50%, respectively, the percentage of women in the study sample who took any paid maternity leave is at the higher end of national estimates. This may be due to our focus on women and maternity leave, rather than family leave, which covers a broader range of workers. Paid paternity leave benefits, for instance, are much less commonly available and used, which may account in part for the low percentage of U.S. workers (13%) reporting access to paid family leave.[13] When considering paid maternity leave in particular, the percentage of women in our study sample who took such leave does not exceed national estimates of leave availability (21-58%).[11, 12] It may also be possible that respondents considered other forms of paid time off work (such as accrued vacation days or paid sick days) as paid maternity leave if they were used in this capacity.

Nevertheless, we find persistent disparities in the use and duration of paid maternity leave. Higher percentages of non-Hispanic Black and Hispanic women take no maternity leave compared to non-Hispanic White women, indicating that unpaid maternity leave may be less accessible to the first two groups, whether due to employer policy or financial difficulty. In addition, women in the lowest income group tend to take no leave, while those with mid-level incomes tend to take unpaid-only and those in the highest income group tend to take partially- or fully-paid leave. Similar patterns of racial/ethnic and socioeconomic disparity are also reflected in maternal/infant health outcomes. Mortality rates for infants born to African-American women (12.4 per 1,000 births), for instance, were nearly twice the national average (6.4 per 1,000 birth) in

2009.[34] The relative risk of neonatal mortality in the most socioeconomically deprived groups compared to that in the least deprived groups has increased from 36% higher in 1985-89 to 43% higher in 1995-2000.[35] State- or federal-level policies that increase access to paid and unpaid maternity leave, including more lenient criteria to qualify for FMLA and some length of paid leave made available to vulnerable groups such as women of color and lower-income women in particular, may help support the reduction of these socio-demographic disparities over the life course.

Several states have implemented legislation providing paid family leave in recent years. In these states, including California and New Jersey, take-up rates for paid leave increased significantly after the policies were implemented, especially among workers with lower-wage jobs.[36, 37] While some research shows mandated benefits such as paid maternity leave to be associated with decreases in women's wages, often as a compensatory effort by employers in response to the real or perceived costs of making paid leave available,[38, 39] more recent studies suggest that women who have access to paid maternity leave tend to work more hours compared to women without such access, with a corresponding increase in wages.[40] In addition, access to both paid and unpaid maternity leave is strongly associated with women's return to the labor force following childbirth, which reduces loss of employment-related earnings in the longer term.[5, 6] It may also be difficult to attribute gender wage gaps to paid family leave policies, which are the focus of current policy efforts (rather than maternity-only leaves), as they apply equally to male and female employees. In states that have implemented paid family leave policies, financing structures that shift the costs of providing paid leave at least partially to

employees have seen most employers reporting little to no cost increases as a result.[41] Given the demonstrated effectiveness of regional and state policies in encouraging the use of paid leave, as well as their relative cost-effectiveness to employers, it is possible that proposed federal legislation such as the FAMILY Act may also help expand access to paid maternity and family leave without incurring substantial costs to employers or widening the gender wage gap. Any unintended consequences of such policies, however, should be carefully considered and monitored. A federal policy may also be more effective than state-level policies in reducing regional disparities in leave availability, especially in states with a higher percentage of small employers or households below the poverty level.

Limitations

These findings should be considered relative to their limitations. While the LTM3 is a unique source of data about women's experiences with health and employment around the time of childbirth, it lacks detailed information about respondents' occupation and industry, employer size, and length of employment at their current workplace, which could determine whether women have access to paid and unpaid maternity leave. Though household income serves as a proxy for these attributes in our analysis, future studies should include more specific information on the conditions of women's employment in addition to detailed health indicators. Moreover, it is possible that the characteristics of women who do and do not take leave differ systematically, affecting health outcomes independently of maternity leave use. By calculating the propensity of respondents to take paid leave and conducting our analyses using both survey and propensity score

weights, we aimed to account for any significant differences in observed characteristics between these two groups. There could, however, still remain unobserved characteristics that we were not able match on, which may bias our results. Additionally, our study focuses mainly maternity leave, as women are most commonly the primary caregivers for infants and young children in the U.S. While the LTM3 dataset does include information about the types of social support available to respondents, including whether child care responsibilities were shared with a partner or other family members and friends, there are no questions asking specifically about paid leave available to caregivers other than mothers (such as paternity leave). Given the implications for gender disparities, especially in terms of employment and wages, we recommend more detailed data collection and research efforts addressing access to and use of paid leave among fathers and other non-maternal caregivers.

There may also be uncertainty in the directionality of associations between maternity leave use and maternal/infant health, especially in cases where severe illness or complications during pregnancy or birth may necessitate leave. The Pregnancy Discrimination Act of 1978 requires employers to provide employees with pregnancy- or childbirth-related conditions the same temporary disability benefits as employees with other medical conditions; in many states, any medical complications in pregnancy or childbirth allows women to request temporary disability benefits for a longer duration.[42] Women who experience complications may therefore have better access to postpartum leave or be more inclined to use the leave available to them. Recall bias regarding the type of leave used (e.g., maternity versus disability) or the duration of leave may also be

possible, as all data were self-reported. While our models are adjusted for several birth-related characteristics that could affect women's decisions regarding leave use, we recommend further study into such factors and the directionality between the use of maternity leave and the health of new mothers and infants.

Despite these limitations, the LTM3 represents one of the most comprehensive of national data currently available to include indicators for both employment and health. As work-life balance and family-friendly workplace practices continue to surface in national policy debates, this study aims to serve as a basis for future data collection and analysis efforts on issues related to family leave and health throughout the lifespan.

Conclusion

Consistent with international findings, we find maternity leave use and duration in the U.S. to have positive associations with maternal and infant health. In particular, the use of paid maternity leave is associated with lower likelihood of maternal and infant re-hospitalization and positive maternal health behaviors such as exercise and stress management. Policies that expand access to paid maternity leave may help contribute toward not only cost savings in terms of reduced healthcare utilization and improved employee retention, but also immediate and longer-term improvements in the health of women, children, and families throughout the United States.

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Table 1.1. Distribution of maternity leave use/duration and maternal/infant health outcomes (N=700)

	N	% (weighted)
Maternity leave		
Use of leave		
None	189	29.7
Unpaid only	153	20.5
Partially/fully paid	358	49.7
Paid leave duration		
0 weeks	342	50.3
1-6 weeks	179	25.9
7-12 weeks	151	20.7
More than 12 weeks	28	3.1
Health outcomes		
Infant health		
Excellent infant health status	529	77.3
Overnight hospitalization since birth	73	10.2
Well-child visits meets AAP[a] recommendations	199	28.5
Sick-child visits exceeds 50th percentile	358	48.2
Maternal health		
Overnight hospitalization since giving birth	76	11.6
Pain interfered with activities at 2 months PP[b]	210	32.7
Depressive symptoms in past 2 weeks	108	15.9
Saw a mental health provider since giving birth	124	19.5
Health behaviors (doing very/extremely well with…)		
Diet	234	36.4
Exercise	175	32.3
Sleep	192	29.3
Stress	270	38.4

[a]AAP = American Academy of Pediatrics

[b]PP = Post-partum

Table 1.2. Distribution of paid maternity leave use & duration by socio-demographic characteristics (N=700)

	Maternity leave use				***Paid maternity leave duration (in weeks)***					***Total***
	None	Unpaid	Paid	p-value	0	1-6	7-12	>12	p-value	
Socio-demographic characteristics										
Age				0.067					**0.003**	
18-24	34.4	18.9	18.6		28.1	24.6	12.1	11.8		23.3
25-29	24.7	30.9	29.5		27.2	36.9	23.0	10.9		28.3
30-34	23.0	26.0	32.6		24.2	25.2	41.6	34.6		28.4
35 or older	17.9	24.2	19.4		20.5	13.4	23.3	42.8		19.9
Race/ethnicity				**0.042**					0.265	
White, non-Hispanic	58.2	75.0	61.4		65.0	53.9	70.4	63.9		63.2
Black/African-American, non-Hispanic	18.3	5.8	12.2		13.2	16.1	7.8	8.8		12.7
Hispanic/Latina	19.8	16.1	18.2		18.3	20.2	15.0	23.0		18.3
Other / Missing	3.7	3.2	8.2		3.5	9.8	6.8	4.2		5.8
Education				0.448					0.636	
High school or less	26.2	31.0	22.2		28.2	23.5	22.7	8.4		25.2
Some college/Associate's degree	32.7	29.5	27.7		31.4	29.4	26.3	23.1		29.6
Bachelor's degree	23.0	27.0	28.5		24.6	26.1	30.0	39.1		26.6
Graduate education/degree	18.2	12.4	21.5		15.8	21.0	21.0	29.4		18.7
Income				**0.028**					**0.013**	
<=$15,000 to $44,700	33.8	23.1	22.6		29.4	25.2	21.5	9.2		26.0
$44,701 to $75,300	34.3	40.9	28.3		37.0	32.6	25.2	13.2		32.7
$75,301 and above	31.9	36.0	49.1		33.6	42.2	53.3	77.7		41.3
Census region				0.922					0.525	
Northeast	22.1	19.5	17.5		21.0	14.9	17.8	36.6		19.3
Midwest	20.9	20.9	24.7		20.9	23.8	28.0	10.2		22.8
South	36.4	38.3	39.8		37.2	42.7	37.9	28.1		38.5
West	20.6	21.3	18.1		20.9	18.6	16.3	25.1		19.5

Married at time of childbirth	66.0	75.1	72.7	0.361	69.7	66.7	81.6	63.8	0.135	71.2
Birth-related characteristics										
Mode of delivery				0.258					0.058	
Vaginal	75.1	64.9	67.3		70.9	75.9	58.2	56.0		69.1
Cesarean	24.9	35.1	32.7		29.1	24.1	41.8	44.0		30.9
First-time mother	44.5	42.8	48.3	0.666	43.8	51.1	43.2	59.5	0.903	46.1
Complex pregnancy[a]	40.7	28.4	35.3	0.251	35.7	36.5	35.2	26.2	0.903	35.5
Low birthweight	11.6	3.8	7.1	0.099	8.4	7.9	5.8	9.7	0.882	7.8

[a]Complex pregnancy refers to any of the following conditions being present prior to pregnancy: depression, Type 1 or 2 diabetes, high blood pressure, or obesity (BMI $\geq$ 30kg/m^2)

Table 1.3. Maternal and infant health indicators by use of paid maternity leave (N=700)

	Used paid leave (AOR=1.0) compared to…				
	Did not use paid leave (n=700)			Used unpaid leave only (n=511)	
	AOR	95% CI		AOR	95% CI
Infant health					
Excellent health status	0.85	0.57	1.27	1.09	0.68
Overnight re-hospitalization	**0.53***	**0.30**	**0.96**	0.81	0.37
Well-child visits	0.89	0.61	1.29	0.90	0.57
Sick-child visits	1.36	0.97	1.91	1.17	0.76
Maternal health					
Overnight re-hospitalization	**0.49***	**0.28**	**0.87**	0.61	0.29
Postpartum pain	0.94	0.64	1.38	0.93	0.59
Depressive symptoms	0.88	0.55	1.42	0.87	0.48
Mental health care use	**0.53****	**0.33**	**0.85**	0.72	0.41
Maternal health behaviors					
Doing very / extremely well with…					
Diet	1.07	0.74	1.54	1.21	0.75
Exercise	1.48	0.98	2.22	**1.76***	**1.05**
Sleep	1.17	0.80	1.72	1.14	0.71
Stress	1.38	0.97	1.95	**1.78***	**1.14**

[a]Note: * p<0.05, ** p<0.01, *** p<0.001

[b]All models adjusted for age, race/ethnicity, education, household income, Census region, marital status, mode of delivery, parity, pregnancy complexity, low infant birthweight, and length of time since birth of child.

Table 1.4. Maternal & infant health indicators by duration of paid maternity leave (N=700)

	Length of paid leave used (Base = 0 weeks)								
	1-6 weeks			7-12 weeks			12+ weeks		
	AOR	95% CI		AOR	95% CI		AOR	95% CI	
Infant health									
Excellent health status	0.63	0.38	1.05	0.80	0.44	1.42	0.66	0.22	1.94
Overnight re-hospitalization	0.54	0.27	1.10	0.72	0.34	1.52	**0.26***	**0.07**	**0.94**
Well-child visits	0.83	0.50	1.39	0.91	0.54	1.54	1.22	0.49	3.03
Sick-child visits	1.40	0.90	2.17	1.33	0.82	2.16	1.79	0.75	4.30
Maternal health									
Overnight re-hospitalization	0.65	0.31	1.35	0.58	0.23	1.45	0.34	0.08	1.47
Postpartum pain	0.89	0.54	1.46	1.06	0.62	1.81	1.56	0.64	3.81
Depressive symptoms	1.15	0.63	2.11	1.17	0.61	2.25	0.25	0.05	1.23
Mental health care use	0.59	0.33	1.06	0.67	0.36	1.25	**0.28***	**0.08**	**0.95**
Maternal health behaviors									
Doing very / extremely well with…									
Diet	1.18	0.73	1.90	0.94	0.56	1.57	1.11	0.43	2.87
Exercise	1.15	0.69	1.94	1.58	0.88	2.84	2.14	0.83	5.51
Sleep	1.27	0.78	2.08	1.28	0.73	2.23	0.79	0.28	2.25
Stress	1.46	0.93	2.30	1.30	0.81	2.08	0.97	0.40	2.37

[a]Note: * p<0.05, ** p<0.01, *** p<0.001

[b]All models adjusted for age, race/ethnicity, education, household income, Census region, marital status, mode of delivery, parity, pregnancy complexity, low infant birthweight, and length of time since birth of child.

Aim 1.Technical appendix

This technical appendix includes additional information on the analytic approach used in this aim, including a more detailed description of the variables and methods used to complete the propensity score matching. Also outlined are the decision processes involved in operationalizing the maternity leave and maternal/infant health variables, including the analytical results using previous versions of each variable. This information is included in order to delineate the different analytical choices that were considered and the reasons for selecting the final analytical approach.

Propensity score matching

Women who do and do not use paid maternity leave are likely to differ systematically in terms of socio-demographic characteristics,[1] which has potential to bias the results of the analytical models used in this aim. In order to offset any potential selection bias, two approaches were considered: instrumental variable estimation and propensity score matching. Due to the nature of the LTM3 data—outcomes were not censored or truncated, i.e., all outcomes of interest were observable regardless of whether women took paid leave; and little information on employer characteristics, thereby limiting the availability of appropriate instruments[2]—it was decided that propensity score matching would be the most useful approach to addressing selection bias.[3, 4]

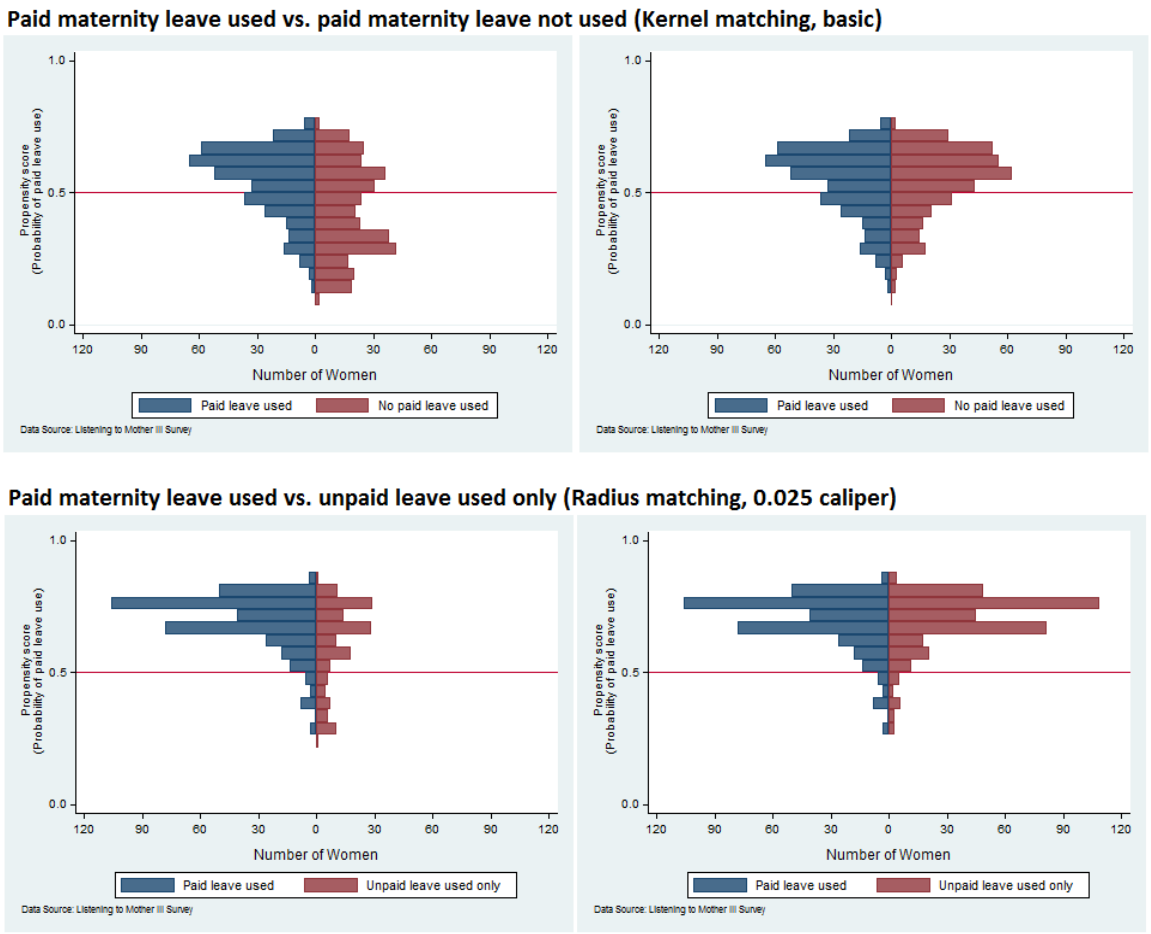
Separate matching processes were completed for the groups described in the two main predictors: 1) women who took paid maternity leave versus those who did not, and 2) women who took paid maternity leave versus those who took unpaid leave only.

Logistic regression was used to predict the likelihood of using paid leave versus each of the two comparison groups, with covariates tested and selected based on their statistical significance, and propensity scores generated from their inverse. The final propensity score models included as covariates age, education, income, whether respondents were working full-time at the time of the postpartum survey, whether child care responsibilities were shared equally with a partner, and whether the respondent's employer was fully responsive to any requests for pregnancy-related workplace accommodations. The child care variable was included due to literature indicating child care availability and cost to be an important factor in women's decisions to return to work postpartum,[5, 6] and the workplace accommodation variable was included as an indicator of the generosity of employer benefits and/or employer support for family-friendly workplace policies. [7, 8] Additional characteristics tested, but ultimately excluded due to non-significance, included race/ethnicity, marital status, maternal health (complex pregnancy) and infant health (NICU stay and low birth weight).

Matching methods tested included one-to-one, one-to-k (nearest neighbor), radius, and kernel matching. Each method was tested with and without replacement, with and without calipers (0.01, 0.025, 0.05), and with and without common support. One-to-k matching was tested with the nearest 2, 5, and 10 neighbors. The final matching approaches were selected based on goodness-of-fit overall, as well as for balance in each of the covariates. Kernel matching with no common support, no calipers, and no replacement was used to match women who took paid leave with those who did not, while radius matching with a 0.025 caliper and no replacement or common support was used to match women who took paid leave with those who took unpaid leave only. The

results of the propensity score matching are shown in Figure 7, while the results of the sensitivity analysis—i.e., each of the regression models run using the unmatched sample—are shown in Appendix Table 1.1.

Figure 7. Propensity score matching results for Aim 1



Operationalization of maternity leave

Due to the way questions on maternity leave were asked in the LTM3 survey, there were a number of ways that maternity leave could have been measured. Initially, two three-category variables were used to simultaneously represent both the availability

and the use of maternity leave (one each for paid and unpaid leave), with categories being "No paid/unpaid leave available," "Available, but not taken," and "Available and taken." Appendix Tables 1.2 and 1.3 show the results of logistic regression models that used these categorical predictors to estimate the likelihood of maternal and infant health outcomes. However, it was difficult to discern the reasons for women choosing not to take their available leave, especially when the leave available was paid. Women may choose not to take unpaid leave due to several reasons: financial constraints that prevent them from forgoing an income for any length of time, having enough paid leave available that taking unpaid leave was unnecessary, pressure from employers to return to work soon after childbirth, or any of a number of reasons. Explanations for passing up paid leave may be similarly varied, including workplace responsibilities that require a quick return to work, other sources of support or income that make paid maternity leave redundant, and others. Previous research suggests that the relationship between leave take-up and use may not be linearly associated with socio-economic characteristics; rather, women at the lowest and highest income levels tended not to take the full length of leave available to them, often due to workplace demands.[6, 9] Because the data did not allow for meaningful interpretation of the results for women who did not take the leave available to them, whether paid or unpaid, it was decided to split the predictors of interest into a series of binary variables indicating whether or not paid and unpaid maternity leave were available and whether or not paid and unpaid leave were taken.

After additional rounds of analyses, it was further decided to focus on use of paid and unpaid maternity leave, as the pathways for the associations between leave availability and postpartum heath were less direct. Initially, a single 3-category variable

was created to represent both paid and unpaid leave use, with the categories being "None used," "Unpaid leave used only," and "Partially- or fully-paid leave used." Under this variable, women who used either paid leave only or a combination of paid and unpaid leave were categorized as having used partially- or fully paid leave. Appendix Table 1.4 shows the results of using this categorical variable to predict the likelihood of maternal and infant health indicators of interest. However, this specification did not allow the comparison of women who used paid maternity leave to those who used unpaid leave only; given that the latter is the status quo for most women in the U.S., due to the provisions of the FMLA (12 weeks of unpaid, job-protected family leave made available to eligible employees), the decision was made to focus on paid maternity leave as the main predictor of interest, with two different comparison groups: women who did not used paid leave (i.e., those who took no leave or unpaid leave only), and women who took only unpaid leave. As policy debates on family leave in the U.S. current center on the provision of paid leave, this approach to operationalizing maternity leave was deemed to be the most policy-relevant and easily understood.

Operationalization of maternal & infant health

One strength of the LTM3 survey is the richness of data on the health of women and infants, both during pregnancy and after childbirth. Originally, the intent of this aim was to investigate associations between maternity leave and the full range of potentially-relevant maternal and infant health indicators available. The infant health variables included overall health status, whether or not the infant had been re-hospitalized since birth, whether the number of well-child visits since birth met the recommendations of the

American Academy of Pediatrics, and the number of sick-child visits per week of life (initially divided into quartiles, then collapsed into a binary variable). Indicators for maternal physical health included overnight hospitalization since childbirth; whether pain interfered with routine activities during the first two months postpartum; and whether or not a series of six physical conditions (back pain, frequent headaches, lack of sexual desire, physical exhaustion, weight control, and loss of sleep) were experienced as a major or minor new problem during the first two months postpartum, and whether these problems persisted at the time of survey. Maternal mental health was represented by indicators for feelings of depression and stress during the first two months postpartum and at the time of survey, seeing a mental health professional since giving birth, symptoms of depression during the two weeks prior to survey, emotional state during the first two months postpartum, and whether physical or mental health conditions interfered with respondents' ability to care for their infant during the first two months postpartum. Further, 3-category variables were created to represent respondents' perceptions of how well they were doing with four health-related behaviors in the two weeks prior to survey: exercise, diet, stress management, and sleep. The results of the analyses using these variables can be seen in Appendix Table 1.3.

In subsequent iterations of the analyses for this aim, the outcome variables were pared down to preserve sample size and to refrain from making more granular distinctions than the LTM3 data could support. Many of the categorical variables, including those representing the number of well- and sick-child visits, maternal emotion state, and each of the four health-related behaviors, were collapsed into dichotomous variables, with cut-off points determined by sample distribution and policy or practical

relevance. While all infant health indicators were preserved, the indicators for maternal physical and mental health were pared down to two for each domain, based on their frequency of occurrence and representativeness of the overall domain (physical or mental health): re-hospitalization since childbirth and pain interfering with routine activities to represent physical health, and depressive symptoms and the use of mental health care services to represent mental health. All four health-related behaviors (diet, exercise, sleep, and stress management) were retained in the final analyses, though, as noted, the variables were condensed from 3-category to dichotomous variables (Tables 1.3 and 1.4).

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Appendix Table 1.1. Maternal & infant health indicators by use/duration of paid maternity leave (without propensity score weighting)

	Used paid leave compared to…						***Length of paid leave used (Base = 0 weeks) (n=700)***								
	Did not use paid leave (n=700)			Used unpaid leave only (n=511)			1-6 weeks			7-12 weeks			12+ weeks		
	AOR	95% CI		AOR	95% CI		AOR	95% CI		AOR	95% CI		AOR	95% CI	
Infant health															
Excellent health status	0.950	0.60	1.51	0.891	0.50	1.59	0.802	0.47	1.38	1.321	0.73	2.39	0.570	0.18	1.79
Overnight re-hospitalization	**0.447***	**0.23**	**0.87**	0.698	0.29	1.71	**0.313****	**0.14**	**0.72**	0.611	0.27	1.41	1.055	0.14	7.74
Well-child visits	0.893	0.56	1.43	0.835	0.48	1.47	0.829	0.47	1.47	0.857	0.45	1.65	2.118	0.79	5.68
Sick-child visits	1.207	0.79	1.85	0.945	0.54	1.65	1.276	0.77	2.13	1.074	0.62	1.85	1.698	0.60	4.81
Maternal health															
Overnight re-hospitalization	0.569	0.29	1.13	1.378	0.51	3.73	0.570	0.25	1.31	0.482	0.19	1.20	1.330	0.31	5.79
Postpartum pain	0.770	0.49	1.22	0.828	0.47	1.46	0.720	0.41	1.25	0.864	0.46	1.61	0.604	0.17	2.14
Depressive symptoms	1.040	0.59	1.83	1.411	0.67	2.98	1.107	0.57	2.16	0.966	0.50	1.88	0.908	0.13	6.19
Mental health care use	**0.548***	**0.30**	**0.99**	0.786	0.37	1.69	**0.421***	**0.22**	**0.82**	0.803	0.37	1.76	**0.240***	**0.06**	**0.94**
Maternal health behaviors															
In past 2 weeks, doing very / extremely well with…															
Diet	0.822	0.52	1.29	0.823	0.45	1.50	0.846	0.50	1.42	0.764	0.41	1.42	1.017	0.40	2.61
Exercise	1.075	0.66	1.76	1.247	0.62	2.49	0.840	0.48	1.47	1.379	0.71	2.68	1.714	0.62	4.76
Sleep	1.040	0.65	1.66	0.951	0.51	1.77	1.093	0.63	1.89	0.970	0.52	1.81	1.059	0.38	2.96
Stress	0.959	0.63	1.46	0.996	0.56	1.76	1.061	0.65	1.73	0.863	0.49	1.51	0.766	0.26	2.23

[a]Note: * p<0.05, ** p<0.01, *** p<0.001

[b]All models adjusted for age, race/ethnicity, education, household income, Census region, marital status, mode of delivery, parity, pregnancy complexity, low infant birthweight, and length of time since birth of child.

Appendix Table 1.2. Infant health by three-category variables for paid and unpaid maternity leave (N=700)

	Paid leave (Base = None available)						***Unpaid leave (Base = None available)***					
	Available, not used			Available & used			Available, not used			Available & used		
	AOR	95% CI		AOR	95% CI		AOR	95% CI		AOR	95% CI	
Excellent health (as reported by mother)	**0.347****	**0.17**	**0.72**	0.645	0.37	1.12	**0.384****	**0.20**	**0.72**	**0.519***	**0.28**	**0.95**
Overnight hospitalization since birth	**5.757*****	**2.31**	**14.34**	1.046	0.46	2.35	**4.127****	**1.72**	**9.89**	1.858	0.73	4.73
Meets number of AAP-recommended well-child visits	0.617	0.28	1.35	0.751	0.45	1.25	0.790	0.44	1.42	0.886	0.50	1.57
Number of sick-child visits per wks of life (Base = 1st quartile)												
2nd quartile	0.639	0.25	1.63	0.780	0.39	1.57	0.804	0.38	1.71	1.577	0.77	3.25
3rd quartile	0.734	0.29	1.86	1.150	0.60	2.22	1.196	0.58	2.46	1.597	0.77	3.32
4th quartile	0.668	0.28	1.57	0.933	0.48	1.83	1.745	0.82	3.71	**2.197***	**1.03**	**4.67**

*All models controlled for age, race/ethnicity, education, income, marital status, Census region, mode of delivery, parity, pregnancy complexity, low birthweight, and infant age.

Appendix Table 1.3. Maternal mental health by three-category variables for paid and unpaid maternity leave

	Paid leave (Base = None available)						***Unpaid leave (Base = None available)***					
	Available, not used			Available & used			Available, not used			Available & used		
	AOR	95% CI		AOR	95% CI		AOR	95% CI		AOR	95% CI	
Mental health & emotional state												
Feelings of depression during first 2 months	1.240	0.63	2.45	0.772	0.46	1.28	1.064	0.62	1.84	1.071	0.63	1.83
Still a problem at time of survey (n=237)	1.188	0.43	3.26	**0.340***	**0.14**	**0.81**	1.581	0.60	4.18	0.613	0.25	1.51
Feelings of stress during first 2 months	0.530	0.28	1.02	0.628	0.39	1.02	0.942	0.56	1.59	1.341	0.80	2.25
Still a problem at time of survey (n=409)	1.524	0.63	3.66	1.007	0.54	1.89	**2.567***	**1.15**	**5.71**	1.245	0.64	2.44
Used mental health care since giving birth	**3.949*****	**1.88**	**8.29**	0.921	0.46	1.85	**2.151***	**1.03**	**4.48**	1.447	0.67	3.11
Symptoms of depression in past 2 weeks	1.773	0.78	4.04	1.183	0.65	2.15	0.828	0.41	1.69	1.096	0.55	2.18
Emotional state in first 2 months (Base = Very negative)												
Somewhat negative	2.099	0.49	9.00	**3.122***	**1.04**	**9.34**	1.162	0.33	4.15	2.321	0.69	7.77
Neutral	1.189	0.32	4.46	1.131	0.44	2.91	0.989	0.35	2.82	1.597	0.57	4.49
Somewhat positive	0.778	0.20	3.01	1.691	0.67	4.26	1.238	0.40	3.84	2.252	0.79	6.45
Very positive	0.797	0.23	2.79	2.274	0.96	5.40	1.235	0.44	3.43	2.280	0.85	6.10
Role function & health-related behaviors												
Physical/mental health interfered with child care in first two months postpartum	**7.189*****	**3.22**	**16.04**	**3.682*****	**1.93**	**7.03**	1.495	0.80	2.80	0.808	0.42	1.55
Health behaviors in past 2 weeks (Base = Not / somewhat well)												
Exercise												
Fairly well	**4.033****	**1.79**	**9.11**	1.678	0.94	3.00	0.648	0.34	1.25	0.680	0.37	1.24
Very/extremely well	**2.774****	**1.30**	**5.91**	1.528	0.84	2.78	0.901	0.48	1.68	0.691	0.36	1.32
Diet												
Fairly well	2.098	0.96	4.61	**2.332****	**1.35**	**4.02**	0.693	0.36	1.33	1.050	0.56	1.97
Very/extremely well	1.387	0.57	3.36	1.221	0.70	2.14	0.714	0.38	1.34	0.989	0.52	1.90

Stress												
Fairly well	1.087	0.46	2.56	0.985	0.57	1.71	0.662	0.35	1.25	0.928	0.51	1.69
Very/extremely well	1.768	0.79	3.94	1.139	0.66	1.97	1.008	0.54	1.88	1.300	0.71	2.37
Sleep												
Fairly well	1.615	0.78	3.32	**1.719***	**1.02**	**2.91**	0.676	0.38	1.22	1.136	0.64	2.02
Very/extremely well	1.056	0.47	2.37	1.260	0.72	2.22	1.019	0.53	1.96	1.439	0.77	2.70

*All models controlled for age, race/ethnicity, education, income, marital status, Census region, mode of delivery, parity, pregnancy complexity, low birthweight, and infant age.

Appendix Table 1.4. Infant & maternal health indicators by combined indicator for paid and unpaid maternity leave (N=700)

	Infant health											
	Excellent health			*Re-hospitalization*			*Well-child visits*			*Sick-child visits*		
	AOR	95% CI		AOR	95% CI		AOR	95% CI		AOR	95% CI	
Maternity leave use												
None	1.000			1.000			1.000			1.000		
Unpaid only	1.065	0.54	2.11	0.513	0.20	1.30	0.981	0.53	1.82	1.425	0.77	2.62
Partially/fully-paid	0.958	0.54	1.70	**0.306****	**0.14**	**0.67**	0.914	0.53	1.59	1.369	0.83	2.26
	Maternal health											
	Re-hospitalization			*Postpartum pain*			*Depressive symptoms*			*Mental health care use*		
	AOR	95% CI		AOR	95% CI		AOR	95% CI		AOR	95% CI	
Maternity leave use												
None	1.000			1.000			1.000			1.000		
Unpaid only	**0.346***	**0.13**	**0.92**	0.971	0.52	1.83	0.704	0.33	1.52	0.598	0.27	1.31
Partially/fully-paid	**0.397***	**0.18**	**0.88**	0.774	0.45	1.32	0.914	0.47	1.80	**0.429***	**0.22**	**0.84**

[a]All models adjusted for age, race/ethnicity, education, income, Census region, marital status, child care arrangement, mode of delivery, parity, pregnancy complexity, low infant birthweight, and length of time since birth.

Aim 2. State-level policies for maternity leave predict access to paid and unpaid leave across U.S. states

Abstract

The Family and Medical Leave Act (FMLA) requires large U.S. employers to provide eligible employees with 12 weeks of unpaid family leave each year. Many states have also implemented policies expanding on FMLA provisions by providing paid leave, expanding eligibility criteria, or extending FMLA duration. Using the National Survey of Family Growth 2006-10, we compared the availability, use, and duration of maternity leave across U.S. states by types of state-level leave policy. From 2001-10, one-third of women gave birth in states with state-level maternity leave policies. State policies were associated with higher odds of maternity leave use and longer duration (>12 weeks) of paid and unpaid leave. Publicly-insured women experienced the strongest associations between state-level paid leave policies and paid maternity leave use and duration. Given potential health benefits associated with maternity leave, state and federal policymakers may consider additional FMLA expansions that promote leave access, especially for lower-income women.

Introduction

Maternity leave has demonstrated benefits for infant health and development, as well as maternal mental health.[1-4] At the federal level, the United States protects access to maternity leave through the Family and Medical Leave Act (FMLA), which requires employers with 50 or more employees to make up to 12 weeks of unpaid, job-protected leave available to employees who have worked at least 1,250 hours in the previous 12 months.[5] However, disparities in the availability, use, and duration of maternity leave remain, often along lines of age, income, and occupation. Younger workers are significantly less likely to have access to any leave (75.4% of 18-24-year-olds compared to 80.4% of 34-54-year-olds) and especially paid leave (63.5% versus 82.6%).[6] Higher-income workers ($15.00/hour or above) are more than twice as likely to have access to paid leave and 10% more likely to have access to unpaid leave than those earning less.[7] Individuals who work in management and professional occupations are nearly three times as likely to have access to paid leave and 14% more likely to have access to unpaid leave as those in service industries. As of 2012, over 40% of all employees in the U.S. are excluded from FMLA coverage due to its stringent eligibility criteria; these employees tends to be clustered at the lower ends of earnings levels or working for smaller employers.[7, 8]

One potential strategy to reduce these disparities may lie in policies that individual states adopt with regard to maternity leave. As of 2014, 18 states, including Washington D.C., have implemented additional policies that expand on minimum FMLA provisions and apply to both public and private sector employees.[9] These policies

generally take one of three forms: making some length of paid maternity leave—generally four to six weeks—available to eligible employees, expanding the eligibility criteria for FMLA to include smaller employers or employees with fewer hours worked, and extending the length of unpaid leave covered under FMLA to exceed 12 weeks. Thus far, four states have implemented a paid leave policy; 16, including Washington D.C., have expanded eligibility criteria for FMLA; and eight, including Washington D.C., have extended FMLA coverage. Thirty-three have no state-level leave policies beyond the 12 unpaid weeks protected by the FMLA (Appendix Exhibit A1). Policies for paid family leave in particular are gaining political momentum at the state level, with several states having proposed paid leave legislation within the past year.[10-12]

Public policies that guarantee access to maternity leave have been shown to increase the number of women who can and do use leave.[13-15] Evidence from a number of OECD countries, including Canada, Germany, Great Britain, Norway, and Sweden, suggests that the timing of women's return to work postpartum corresponds closely to the length of paid maternity leave available to them.[13] In the U.S., the impact of the FMLA on leave-taking behaviors has been significant. Take-up of unpaid leave increased 23% among women with infants just two years after the implementation of the FMLA; on average, the FMLA resulted in an average of six additional weeks of unpaid maternity leave taken.[14, 15]

State-level laws in the U.S. also correspond to leave-taking behaviors. California implemented its paid family leave insurance legislation in 2004, while New Jersey did so in 2008; both states have seen significant increases in take-up rates for paid leave, with

more than 1.1 million claims filed in California from 2004-2011 and 60,000 in New Jersey from 2009-2012.[16] Use of paid leave in California under the new legislation was especially prevalent among workers with lower-paid jobs ($20/hour or less) that offer no health insurance benefits; 84% of employees with such jobs took paid leave, compared to only 31% of employees with more well-compensated jobs.[17] Early data from New Jersey, meanwhile, indicate that women who use paid family leave under the new policy have improved employment and wage outcomes compared to women who do not use paid family leave.[16]

Despite over one-third of U.S. states having adopted maternity leave legislation, however, there is little comparative information on how access to paid and unpaid maternity leave may vary across states with different leave policies. Most existing studies on state-level leave policy are confined to evaluating leave use and duration within a single state before and after the implementation of policies such as paid maternity leave. There has also been little research on state policies other than paid maternity leave, such as expanded FMLA eligibility and extended FMLA coverage, either within or across states. With nearly half of U.S. employees ineligible for protection under the FMLA,[8] more lenient eligibility criteria may be significantly associated with increased availability and use of maternity leave. In addition, extended FMLA coverage may allow women to take longer durations of leave, which can have positive implications for maternal and child health.

Using data from the National Survey of Family Growth (NSFG) 2006-2010, this study examines the associations between state-level maternity leave policies and the

availability, use, and duration of paid and unpaid maternity leave. With states often serving as "laboratories of democracy" in federal systems of government such as the U.S., our aim is to produce rigorous new evidence that may be used to inform federal-level policymaking, as well as being of interest to women, children, and families whose health may be affected by such polices.

Methods

Data and study population

The NSFG is a national survey on factors influencing birth rate trends in the U.S. commissioned by the Centers for Disease Control and Prevention. The seventh survey wave conducted since 1973, the NSFG 2006-2010 contains a pregnancy supplement that includes information about respondents' experiences surrounding 20,492 pregnancies.[18] The study population consists of responses about 2,708 pregnancies from women who completed the pregnancy supplement, indicated that they were working during their pregnancies, and fit this study's eligibility criteria (gave birth to a live singleton infant in a U.S. hospital no more than five years prior to survey).

Measurement

The primary outcomes were the availability of any maternity leave and the use and duration of paid and unpaid leave. Respondents were asked whether they took maternity leave and, among those who did not, whether they refrained from taking leave because they "did not need to take maternity leave," "were not offered or allowed to take maternity leave," or for "some other reason." Respondents were coded as having maternity leave available if they selected any reason other than not being offered or

allowed leave. Leave-takers were then asked the total number of weeks of 1) any and 2) paid maternity leave taken. From these questions, we constructed three dichotomous leave use variables indicating whether or not respondents took 1) any, 2) paid, and 3) unpaid maternity leave. Three categorical variables were created to indicate the duration of any, paid, and unpaid leave taken (0, 1-6, 7-12, or >12 weeks).

The main predictor was the type of state-level maternity leave policy in effect in respondents' states of residence at the time of childbirth. From state legislative databases,[9] we determined whether and when each state had implemented any policy pertaining to maternity leave applicable to both public and private sector employees. We then sorted states into four categories: those with 1) any state-level policy addressing maternity leave; 2) paid maternity leave, via either direct financial compensation from the state or employer-based insurance; 3) expanded FMLA eligibility to include smaller employers (<50 employees) or employees who worked <1,250 hours in the previous 12 months; or 4) extended FMLA coverage (>12 weeks). As these policies were not mutually exclusive, we created four separate dichotomous indicators to reflect whether or not respondents had given birth in a state with each of the four policy types.[19]

Covariates included respondents' age at the time of childbirth, race/ethnicity, level of education, marital status, primary payer for the delivery (public insurance—including both Medicaid/CHIP and "other government programs" such as FEHB, HIS, TriCare, VA, and others—or not), parity, mode of delivery, and low infant birth weight (under 5 lbs., 8 oz.).

Analysis

Sample characteristics were described using one-way tabulation. Logistic regression models were used to predict the likelihood of any maternity leave availability and use of any, paid, and unpaid maternity leave by state-level policy type. Duration of any, paid, and unpaid leave was predicted using multinomial logit models. All models were adjusted for the socio-demographic covariates described above. To adjust for state-level clustering effects, we merged in an additional covariate indicating women's labor force participation rate by state.[20] Separately, we stratified each regression model by respondents' insurance type, to determine whether low-income women whose deliveries were financed by public insurance experienced different associations between state-level policy and maternity leave availability, use, and duration. All analyses were weighted to be representative of the target population and conducted using Stata/SE 13.0 (StataCorp).

Limitations

While the NSFG 2006-10 is a unique source of national data on women's experiences during pregnancy and childbirth, all responses were based on retrospective self-report and may be subject to recall bias or diminished precision.[21] Additionally, due to privacy restrictions, respondents' specific state of residence were not included in our dataset, rendering us unable to cluster standard errors by individual states; instead, we included women's labor force participation rates by state as a covariate to adjust for potential clustering effects. Nevertheless, some clustering effects may remain. The analysis may also contain unobserved confounders, such as employer characteristics, that may contribute to maternity leave availability, use, and duration independently of state-level policies. Finally, there is uncertainty in the directionality of association between

state policies and access to maternity leave, i.e., whether policy changes led to differences in leave availability, use, and duration, or whether existing practices and values regarding work-life balance and family leave subsequently incited policy change. Future prospective studies may address these limitations.

Study Results

Overall, 34% of pregnancies occurred in a state with some type of state-level maternity leave policy implemented (Exhibit 1). Expanded FMLA eligibility was the most common type of state-level policy, affecting 29% of respondents, followed by extended FMLA coverage with 17%. Paid maternity leave policy at the state level was in effect for the smallest percentage of respondents (8%). Nonetheless, nearly all respondents (95%) reported having some type of maternity leave available. Around two-thirds took maternity leave (67%), with the proportion of those taking unpaid (45%) and paid (43%) leave being nearly equal.

State-level policies were significantly associated with the use of any and paid maternity leave(Exhibit 2). Women were more likely to take any maternity leave (either paid or unpaid) when living in states with any type of state-level leave policy (AOR, 1.37; 95% CI, 1.1-1.7), expanded FMLA eligibility (AOR, 1.28; 95% CI, 1.0-1.6), or extended FMLA coverage (AOR 1.36; 95% CI, 1.0-1.1), compared to women living in states without such policies. State-level policies for paid maternity leave, while not significantly associated with leave availability or use in the general study population, was significantly associated with more than twice the odds of paid leave use among publicly-insured women (AOR, 2.60; 95% CI, 1.2-5.6).

State-level maternity leave policies are almost universally associated with two to four times higher odds of taking more than 12 weeks of any, unpaid, and paid maternity leave (Exhibit 3). Notably, the association between state-level policies for paid maternity leave and use of >12 weeks of paid leave was more than twice as large among publicly-insured women (AOR, 8.92; 95% CI, 2.7-29.1) as the overall study population (AOR, 4.11; 95% CI, 1.6-10.9), though both were statistically significant. Privately-insured women living in states with paid leave policies had only 2.90 higher odds of taking >12 weeks of paid maternity leave, compared to privately-insured women in states without such policies (95% CI, 0.9-9.0; results not shown). Publicly-insured women also had 4.28 higher odds (95% CI, 1.4-13.0) of taking 7-12 weeks of paid maternity leave in states with state-level paid leave policies compared to those in states without (Exhibit 4); this association, however, is not statistically significant in the overall population, suggesting that policy impact may differ by insurance status, which in this case is also representative of income, as eligibility for public insurance is income-based. State-level policies were not generally associated with significant differences in the use of one to six weeks of maternity leave.

Discussion

The results of our analysis indicate that state-level policies for maternity leave are significantly associated with higher odds of maternity leave use and longer duration of leave across U.S. states, especially among publicly insured women. Overall, these associations tend to be more pronounced for aspects of leave that exceed the unpaid, 12-week leave provided by the FMLA: use of any, paid, and unpaid leave past 12 weeks, as

well as the use and duration of paid maternity leave. These findings are consistent with previous research suggesting significant increases in take-up rates for both paid and unpaid maternity leave after the implementation of public policies that increase the maximum duration of job-protected family leave or provide paid leave.[14, 17, 22] By comparing women who gave birth in states with and without three types of state-level maternity leave policies, we contribute to the existing literature by providing a more comprehensive view of the ways that different types of state leave policies—including expansions on FMLA such as more lenient eligibility criteria and extended duration of coverage, which few prior studies have addressed—may be associated with the availability, use, and duration of maternity leave.

Overall, women in states with more robust maternity leave policies are more likely to take maternity leave and to take longer durations of leave, especially past 12 weeks, compared with women in states that do not have policies expanding or extending FMLA. Contrary to our hypotheses, however, policy types did not always correspond to their expected impact. Expanded eligibility criteria for FMLA, for instance, did significantly predict higher odds of maternity leave use overall and use of 7-12 weeks of unpaid maternity leave compared to 0 weeks, which corresponds to the policy's intended effect of expanding access to unpaid maternity leave up to 12 weeks. However, women in states with expanded FMLA eligibility were also more likely to take more than 12 weeks of both paid and unpaid maternity leave, which is difficult to attribute directly to this type of policy. Similarly, while state-level policies that extend FMLA coverage past 12 weeks were predictably associated with higher odds of unpaid maternity leave use past 12

weeks, women in states with this policy type were also more likely to take more than 12 weeks of paid maternity leave, which is not protected by FMLA, and to take maternity leave overall. These patterns may be partly attributed to the overlap of policies within states, wherein women living in states with policies addressing both FMLA eligibility criteria and duration of FMLA coverage experience the combined effects of the two. Policies may also have a "snowballing" effect, in which employers voluntarily adopt generous leave benefits above and beyond the minimum mandated by state or federal policy. This may occur when employers experience few negative effects from state-level expansions on FMLA, making them more amenable to organizational policies and practices that improve employee retention.[23] Another explanation may be that more generous leave policies may simply reflect stronger cultural and societal emphasis on work-life balance and family-friendly work policies. Rather than directly measurable effects between a specific type of policy and its intended outcome, it may be that a constellation of family-friendly policies—including not only maternity leave, but also workplace accommodations for pregnant employees, paid family and sick leave, resources for child care, etc.—combines to influence women's decisions on postpartum employment and leave-taking.[24-26]

Our findings also suggest that the associations between state-level policies and access to maternity leave vary by health insurance status, such that women who are publicly insured may experience the greatest impact from state leave policies. This is most evident when considering state-level policies for paid maternity leave, which significantly predict higher odds of paid leave use only among publicly-insured women.

Similarly, associations between state policies for paid leave and duration of paid maternity leave were larger by degrees of magnitude among publicly-insured women, compared to the overall population. Public policies pertaining to maternity leave, therefore, may be particularly predictive of access to paid and unpaid maternity leave among lower-income, publicly-insured women who may otherwise lack access to strong workplace benefits. This aligns with earlier studies indicating that take-up rates for paid maternity leave tend to be higher among lower-income women when policies for paid maternity leave were present,[17, 27] and that increases in the use of unpaid leave following the implementation of FMLA differed across women with varying levels of educational attainment.[28]

With demonstrated benefits for infant and maternal mental health,[1-4] maternity leave may be a powerful policy lever for improving maternal and infant health and wellbeing in the U.S. While the FMLA provides a federal baseline for the provision of maternity and family leave, our analysis shows that public policies at the state level play an important role in expanding access to both paid and unpaid leave beyond the federal minimum. The protective effects of these policies may be particularly strong for vulnerable populations, such as low-income, publicly insured women, whose employers may be less likely to offer paid maternity leave or unpaid leave beyond the 12 weeks stipulated by the FMLA. As states continue to adopt policies in support of maternity and family leave, state-level reforms may also help federal policymakers weigh the costs and benefits of adopting similar policies at the federal level. For instance, state-level evidence may be used to inform current policy efforts such as the Family and Medical Insurance

Leave (FAMILY) Act (S.1810 / H.R.3712), which proposes a federal program providing eligible employees with up to 12 weeks of paid leave to care for family members.

While state- or federal-level leave policies may raise concerns over misuse, fewer than 2% of worksites report confirmed misuse of FMLA over 20 years after its implementation.[29] It is important to note that none of the policies implemented by states thus far require the use of maternity leave, and women may choose to take no or shorter durations of leave of their own volition; rather, policies that expand access to FMLA or establish paid leave programs make the option of paid or unpaid leave available to women across socio-demographic lines, potentially reducing the existing inequalities in access to maternity leave and its associated benefits.

Conclusion

State-level policies that build on minimum FMLA stipulations are associated with greater use and duration of paid and unpaid maternity leave. Though many employers do offer generous family leave benefits for their employees, public policies may play an important role in expanding access to maternity leave, especially for publicly-insured, lower-income women. Given the associations between maternity leave—especially when paid and longer in duration—and infant health and developmental outcomes, as well as maternal mental health, more robust policies for maternity and family leave at both state and federal may help reduce disparities in leave access and their attendant benefits, both within and across U.S. states.

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[18] Respondents were asked to respond to questions in the Pregnancy Supplement with regard to a single specific pregnancy/birth; therefore, while the unit of analysis is the pregnancy, each pregnancy effectively represents a single respondent (i.e., no respondent is represented more than once in the dataset).

[19] Respondents were sorted into states of residence during or around the time of their pregnancy and childbirth. Because the inclusion criteria allowed for births up to five years prior to the time of survey, the time frame for births ranged from 2001-2010. The NSFG 2006-10 data contain information from the Census Bureau regarding each respondent's state of residence in 2000 and 2010. If respondents' state of residence did not change between these two time points, they were considered residents of that state; if the state of residence did change from 2000-10, which occurred in 4% of our sample, respondents were assigned to the state of residence nearest to the time of birth. For instance, if a respondent lived in Alabama in 2000 and Alaska in 2010, she would be assigned to Alabama if she had given birth from 2001 through May 2005, but to Alaska if she had given birth from June 2005 through 2010.

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[21] For instance, the state policy variables were based on respondents' reported state of residence during the year closest to the year in which they gave birth, which may or may not reflect their actual state of residence at the time of childbirth. While the percentage of respondents who changed states of residence between 2000 and 2010 was

small (4%), the lack of data on respondents' state of residence at the time of giving birth reduces the precision of these variables. Maternity leave availability may also be overestimated due to the way the variable was constructed, which assumed that all respondents who citedfactors other than being prevented from taking leave as the primary reason for not doing so had leave available, when in fact unavailability could be an additional reason for not taking leave on top of the primary reason.

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Exhibit 1. Socio-demograhic characteristics among a sample of U.S. women who gave birth in 2001-2010 (N=2,708)

	N	% (weighted)
Leave-related characteristics		
State maternity leave policy		
Any	1040	34.0
Paid maternity leave	292	8.2
Expanded FMLA eligibility	890	28.5
Extended FMLA coverage	537	16.6
Individual maternity leave availability/use		
Any maternity leave available	2496	94.6
Any maternity leave taken	1722	67.3
Unpaid maternity leave taken	1156	44.8
Paid maternity leave taken	1046	42.5
Socio-demographic characteristics		
Age		
Under 20	253	8.2
20-24	783	24.6
25-29	820	30.6
30 and over	852	36.6
Race/ethnicity		
Non-Hispanic white	1306	60.8
Non-Hispanic black	668	16.7
Hispanic	606	16.7
Non-Hispanic other	128	5.8
Education		
Less than high school	509	14.9
High school or equivalent	796	27.0
Some college/Associate's degree	788	27.8
Bachelor's degree or higher	615	30.4
Married at time of childbirth	1344	61.6
Publicly insured at time of childbirth	1274	38.2
First-time mother	895	33.6
Mode of delivery		
Vaginal	1918	70.7
Cesarean	790	29.3
Low birth weight (less than 5 lbs., 8 oz.)	203	6.6

Source: Authors' own calculations using data from the *National Survey of Family Growth 2006-2010.*

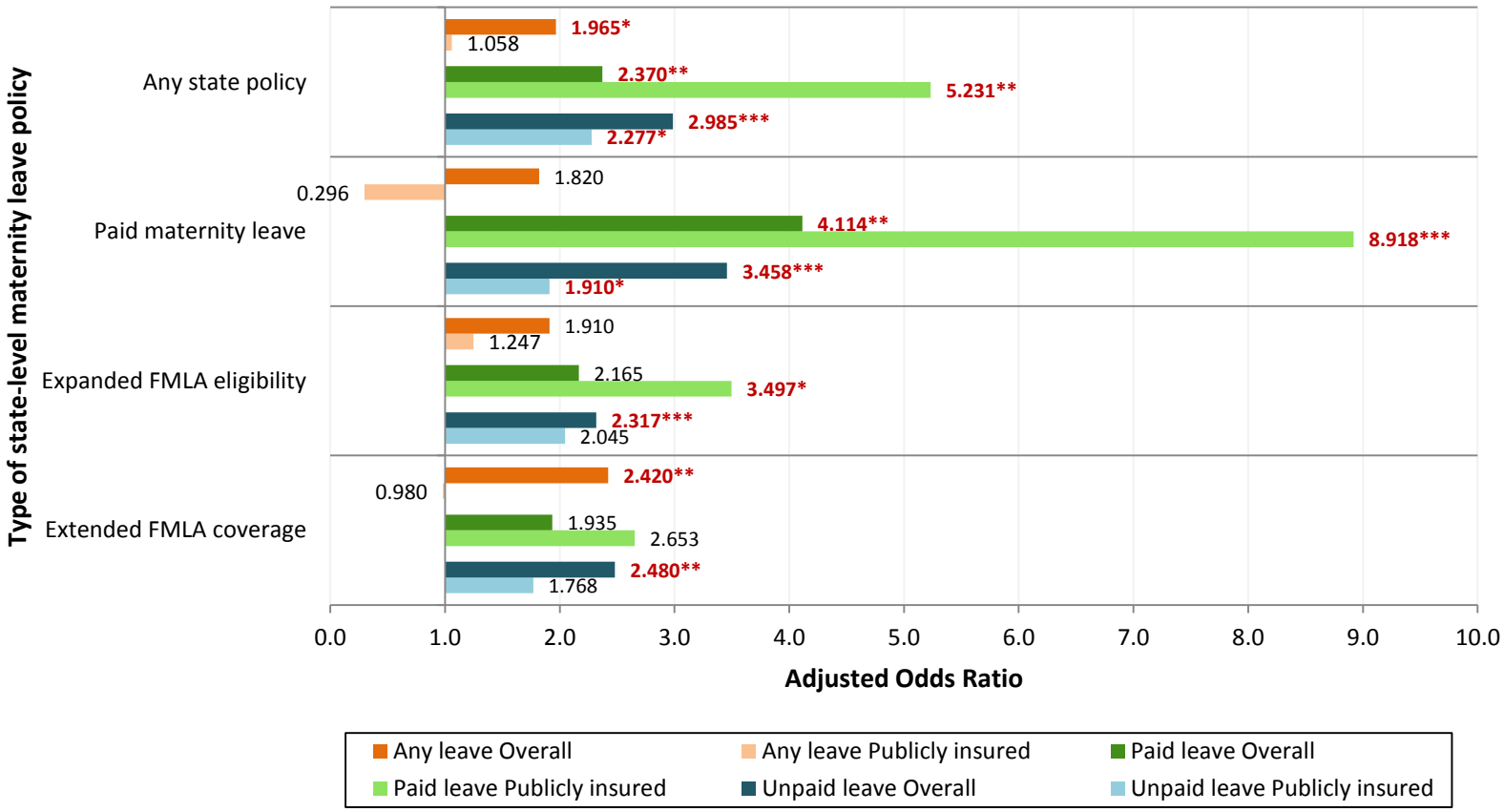
Exhibit 2. Odds of maternity leave availability and use, by type of state-level maternity leave policy

	Any maternity leave availability					
	Overall (n=2,708)			***Publicly insured (n=1,274)***		
State-level policy type	AOR	95% CI		AOR	95% CI	
Any state policy	0.957	0.60	1.52	1.408	0.78	2.54
Paid leave policy	0.810	0.33	2.01	2.150	0.85	5.44
Expanded FMLA eligibility	1.043	0.65	1.67	1.491	0.82	2.71
Extended FMLA coverage	0.971	0.56	1.61	1.137	0.61	2.13
	Any maternity leave use					
	Overall (n=2,708)			***Publicly insured (n=1,274)***		
	AOR	95% CI		AOR	95% CI	
Any state policy	**1.369****	**1.09**	**1.72**	1.410	0.96	2.07
Paid leave policy	1.361	0.88	2.09	1.275	0.73	2.23
Expanded FMLA eligibility	**1.277***	**1.01**	**1.62**	1.227	0.83	1.82
Extended FMLA coverage	**1.362***	**1.03**	**1.08**	1.163	0.76	1.79
	Paid maternity leave use					
	Overall (n=2,708)			***Publicly insured (n=1,274)***		
	AOR	95% CI		AOR	95% CI	
Any state policy	1.386	1.01	1.91	1.624	0.99	2.65
Paid leave policy	1.687	0.82	3.49	**2.602***	**1.24**	**5.64**
Expanded FMLA eligibility	1.384	0.99	1.93	1.494	0.93	2.40
Extended FMLA coverage	1.352	0.86	2.13	1.516	0.89	2.59
	Unpaid maternity leave use					
	Overall (n=2,708)			***Publicly insured (n=1,274)***		
	AOR	95% CI		AOR	95% CI	
Any state policy	1.189	0.90	1.57	1.074	0.68	1.69
Paid leave policy	0.758	0.45	1.27	0.682	0.32	1.44
Expanded FMLA eligibility	1.086	0.81	1.46	1.001	0.62	1.61
Extended FMLA coverage	1.132	0.80	1.60	0.948	0.56	1.62

Source: Authors' own calculations using data from the *National Survey of Family Growth 2006-2010*. Notes: *p<0.05, **p<0.01, and ***p<0.001. All models include as covariates age, race/ethnicity, education, marital status, parity, and low infant birth weight. Models including the entire study sample (i.e., not stratified by insurance provider type) include insurance type as a covariate.

Exhibit 3. Odds of taking >12 weeks of maternity leave, by state-level leave policy, 2001-2010

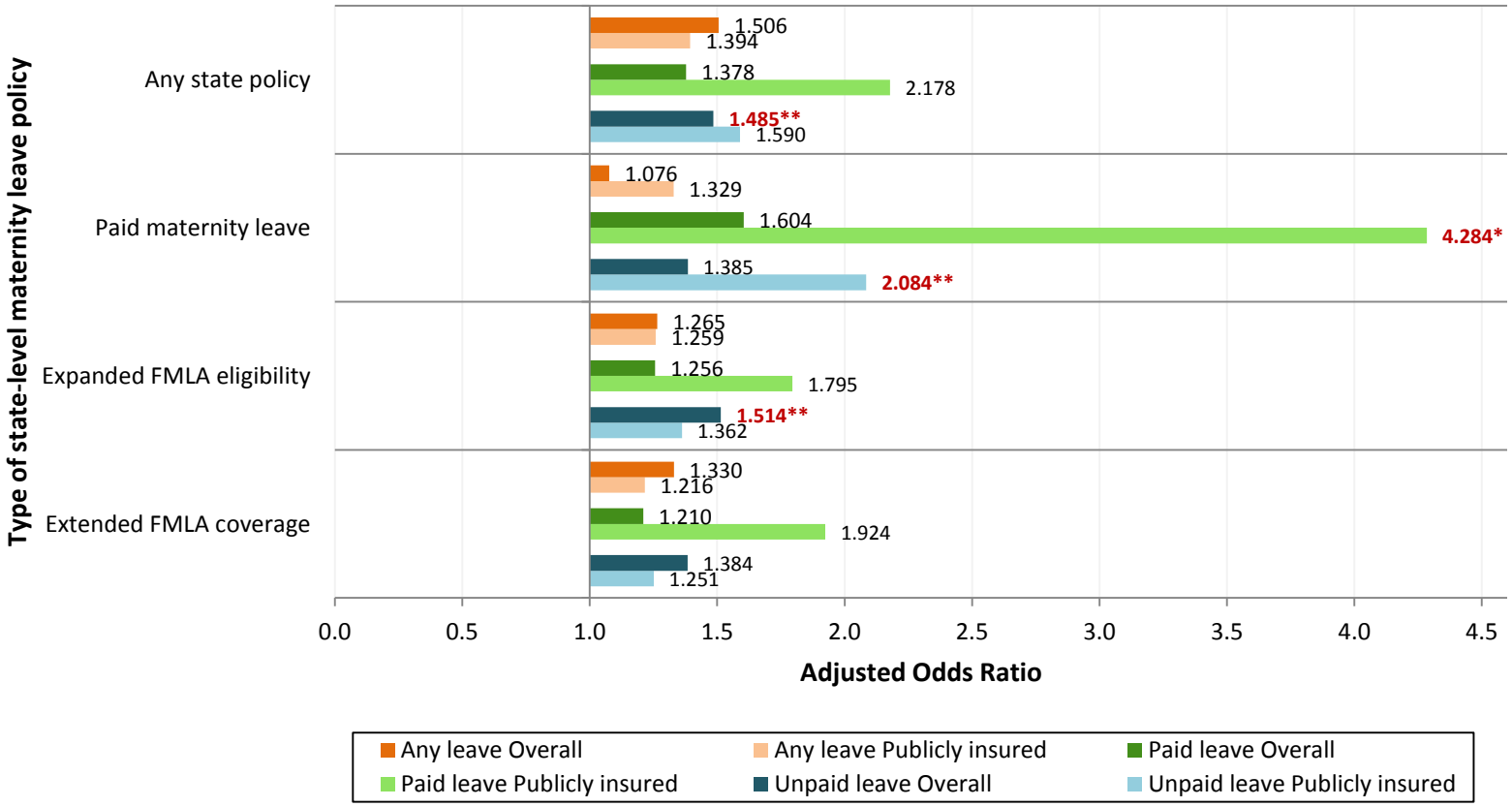
Compared to taking 0 weeks (Overall n=2,708; Publicly insured n=1,247)



Source: Authors' own calculations using data from the *National Survey of Family Growth 2006-2010.*Notes: *p<0.05; **p<0.01; and ***p<0.001. All models include as covariates age, race/ethnicity, education, marital status, parity, mode of delivery, and low infant birth weight. Models including the entire study sample (i.e., not stratified by insurance provider type) include insurance type as a covariate.

Exhibit 4. Odds of taking 7-12 weeks of maternity leave, by state-level leave policy, 2001-2010

Compared to taking 0 weeks (Overall n=2,708; Publicly insured n=1,247)



Source: Authors' own calculations using data from the *National Survey of Family Growth 2006-2010*.Notes: *p<0.05; **p<0.01; and ***p<0.001. All models include as covariates age, race/ethnicity, education, marital status, parity, mode of delivery, and low infant birth weight. Models including the entire study sample (i.e., not stratified by insurance provider type) include insurance type as a covariate.

Aim 2. Technical appendix

This technical appendix details how states were assigned to categories reflecting the type of maternity leave policy in effect at the time nearest respondents' pregnancies, as well as providing an appendix table listing the specific year that each policy type was passed in every state. In addition, it discusses the sensitivity analyses used to isolate state effects in the main regression models and provides the results of those analyses and additional approaches to subgroup analysis by socio-economic status that were considered prior to the current use of stratification.

State policies for maternity leave

Information on state-level policies regarding maternity leave was compiled through legislative archives and summaries by organizations such as the National Conference of State Legislatures and National Partnership for Women and Families.[1,2] After reviewing the available information, policies were assigned to one of three categories: 1) those expanding the eligibility criteria for FMLA (e.g., lowering the required number of hours worked during the past 12 months to fewer than 1,250, making FMLA applicable to employers with fewer than 50 employees), so that more workers would qualify for unpaid leave under FMLA; 2) those extending the duration of FMLA cover past 12 weeks, e.g., to 18 or 24 weeks; and 3) those providing paid maternity leave, mostly through extensions of state temporary disability programs. The decision was made to count states as having a certain policy only if said policy applied to both public- and private-sector workers, the NSFG 2006-10 did not indicate whether respondents worked

in the public or private sector, and private-sector workers tend to make up a larger proportion of the labor force in most states. State legislative archives were also used to determine the year in which the applicable policies in each state were implemented.[3] Appendix Table 2.1 shows the resulting tabulation of state-level policies, which was then used to create the main predictor variables in Aim 2.

Sensitivity analyses for state effects

Restrictions on the geographic variables in the NSFG 2006-10 meant that respondents' state of residence at the time of childbirth were not available. Instead, I worked with the NCHS analyst assigned to this project to create variables representing the policy type(s) in effect in the state of residence cited closest to the year in which each respondent gave birth; the process of creating these variables is detailed in the Methods section of Aim 2. Because these variables masked respondents' individual states of residence, however, it was not possible to use standard methods (e.g., robust standard errors, clustering by individual state) to offset any potential state effects, which had potential to bias the results. Policies such as paid maternity leave, for instance, have been implemented in only four states, one of which (California) has a disproportionately large population; any significant associations between paid leave policies and maternity leave access may therefore reflect the particular characteristics of a single state, rather than the policy as a whole.[4, 5]

To address the issue of state effects and policy endogeneity to the extent possible, newly-released data on state-level indicators related to women's employment and political participation were merged into the NSFG 2006-10 dataset.[6] Four indicators were

selected based on previous literature indication their potential associations with women's employment during the perinatal period: percentage of women in the labor force, percentage of women in professional of managerial occupations, ratio of average child care costs to women's median income, and percentage of state legislative positions that were held by women.[7-10] While doing so still did not allow respondents' specific states of residence to be directly identified, thereby protecting their privacy, including these variables into the main analyses allowed for some measure of adjustment for state effects. Each variable was added individually and stepwise to the regression models predicting likelihood of maternity leave availability, use, and duration by state-level policy, and any significant changes noted. The results of these sensitivity analyses are shown in part in Appendix Tables 2.2 through 2.4. While the inclusion of these variables, both individually and together, did not produce significant differences in the results, it was ultimately decided to include the variable indicating percentage of women in the labor force into the main logistic and multinomial regression models in order to adjust for clustering by state; this particular indicator was chosen due to its successful use as an instrumental variable in previous studies on maternity leave and women's health.[11]

Subgroup analysis

Due in part to earlier literature suggesting different degrees of association between family leave policies and practices by socio-economic status, I was interested in undertaking subgroup analysis to determine whether these differences would be observed in this population as well. Initially, my approach was to include public insurance status (which serves as a proxy for household income in this analysis) as an interaction term

with each of the state-level policy variables and to compare the results of each model with and without this interaction term. After further consideration, it was decided that the sample size was sufficient for a stratified analysis, i.e., running each of the analytical models solely among women whose births were primarily financed by public insurance, then comparing the results to those obtained with the overall study population. Appendix Tables 2.5 and 2.6 show the results of the analysis using the interaction term approach.

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Appendix Table 2.1. Year of implementation for each type of state-level maternity leave policy, by state

State	No state-level leave policy	Paid maternity leave	Expanded FMLA eligibility	Extended duration of FMLA coverage
AL	X			
AK	X			
AR	X			
AZ	X			
CA		2004	1993	1993
CO	X			
CT			1997	1997
DC			2010	2010
DE	X			
FL	X			
GA	X			
HI		1994	1994	
IA			1994	
ID	X			
IL	X			
IN	X			
KS	X			
KY	X			
LA			1997	1997
MA			1972	
MD			2014	
ME			1987	
MI	X			
MN			1987	2014
MO	X			
MS	X			
MT			1983	
NC	X			
ND	X			
NE	X			
NH			1992	
NJ		2009	2001	
NM	X			
NV	X			
NY	X			
OH	X			
OK	X			
OR			2007	2007
PA	X			

RI		2014		1987
SC	X			
SD	X			
TN				1980
TX	X			
UT	X			
VA	X			
VT			1989	
WA	X			
WI			1987	
WV	X			
WY	X			
Total number of states with each policy type				
	33	4	16	8

Source: Authors' compilation of information from legislative archives in each state. Notes: Policies enacted after the year 2010 were not considered when assigning states to policy types, as they fall outside of the time range relevant to this study.

Appendix Table 2.2. Odds of maternity leave availability and use by state leave policy, without % women's labor force participation (N=2,708)

	Any maternity leave available						Any maternity leave used					
	Overall			***Publicly insured***			***Overall***			***Publicly insured***		
	AOR	95% CI		AOR	95% CI		AOR	95% CI		AOR	95% CI	
Any state leave policy	0.554	0.27	1.14	2.360	0.95	5.87	**1.411***	**1.04**	**1.92**	**0.983**	**0.60**	**1.62**
Paid maternity leave	**0.314***	**0.12**	**0.82**	**6.223****	**2.09**	**18.55**	1.335	0.72	2.48	0.928	0.44	1.98
Expanded FMLA eligibility	0.641	0.31	1.34	2.173	0.84	5.59	**1.406***	**1.01**	**1.96**	**0.851**	**0.50**	**1.44**
Extended FMLA coverage	0.740	0.32	1.73	1.524	0.49	4.74	1.384	0.97	1.98	0.840	0.49	1.45

	Unpaid maternity leave used						Paid maternity leave used					
	Overall			***Publicly insured***			***Overall***			***Publicly insured***		
	AOR	95% CI		AOR	95% CI		AOR	95% CI		AOR	95% CI	
Any state leave policy	1.233	0.89	1.71	0.857	0.52	1.41	**1.386***	**1.00**	**1.91**	**1.178**	**0.70**	**1.99**
Paid maternity leave	0.793	0.43	1.47	0.917	0.43	1.96	1.178	0.56	2.50	**2.176***	**1.17**	**4.04**
Expanded FMLA eligibility	1.133	0.81	1.59	0.862	0.52	1.44	**1.430***	**1.01**	**2.01**	**1.045**	**0.63**	**1.73**
Extended FMLA coverage	1.231	0.81	1.88	0.796	0.43	1.47	1.111	0.69	1.80	1.405	0.82	2.40

[a]Note: * p<0.05, ** p<0.01, *** p<0.001

[b]All models adjusted for age, race/ethnicity, education, marital status, insurance coverage, parity, mode of delivery, low birth weight, and percent of women in the labor force by state.

Appendix Table 2.3. Odds of maternity leave availability and use by state leave policy & ratio of child care costs to women's median income (N=2,708)

	Any maternity leave available						Any maternity leave used					
	Overall			***Publicly insured***			***Overall***			***Publicly insured***		
	AOR	95% CI		AOR	95% CI		AOR	95% CI		AOR	95% CI	
Any state leave policy	0.564	0.27	1.19	2.337	0.94	5.83	**1.462***	**1.08**	**1.98**	**0.966**	**0.58**	**1.60**
Paid maternity leave	**0.319***	**0.12**	**0.83**	**6.304****	**2.12**	**18.78**	1.341	0.73	2.47	0.930	0.43	1.99
Expanded FMLA eligibility	0.656	0.31	1.38	2.139	0.84	5.46	**1.447***	**1.05**	**2.00**	**0.839**	**0.50**	**1.42**
Extended FMLA coverage	0.734	0.32	1.71	1.510	0.49	4.70	1.386	0.97	1.98	0.841	0.49	1.45

	Unpaid maternity leave used						Paid maternity leave used					
	Overall			***Publicly insured***			***Overall***			***Publicly insured***		
	AOR	95% CI		AOR	95% CI		AOR	95% CI		AOR	95% CI	
Any state leave policy	1.351	0.96	1.89	0.821	0.49	1.37	1.312	0.94	1.83	1.207	0.71	2.04
Paid maternity leave	0.816	0.44	1.51	0.933	0.44	1.99	1.133	0.54	2.40	**2.145***	**1.15**	**3.99**
Expanded FMLA eligibility	1.229	0.86	1.75	0.833	0.49	1.41	1.350	0.95	1.92	1.073	0.64	1.79
Extended FMLA coverage	1.214	0.80	1.85	0.785	0.42	1.46	1.134	0.70	1.84	1.450	0.84	2.50

[a]Note: * p<0.05, ** p<0.01, *** p<0.001

[b]All models adjusted for age, race/ethnicity, education, marital status, insurance coverage, parity, mode of delivery, low birth weight, and percent of women in the labor force by state.

Appendix Table 2.4. Odds of maternity leave availability and use by state leave policy and % of female state legislators (N=2,708)

	Any maternity leave available						Any maternity leave used					
	Overall			***Publicly insured***			***Overall***			***Publicly insured***		
	AOR	95% CI		AOR	95% CI		AOR	95% CI		AOR	95% CI	
Any state leave policy	0.576	0.28	1.19	2.163	0.85	5.50	1.422*	1.05	1.93	0.973	0.59	1.60
Paid maternity leave	0.278**	0.11	0.72	6.068**	2.05	18.00	1.330	0.71	2.49	0.927	0.44	1.97
Expanded FMLA eligibility	0.648	0.31	1.35	2.000	0.76	5.23	1.410*	1.01	1.97	0.846	0.50	1.42
Extended FMLA coverage	0.695	0.30	1.59	1.422	0.45	4.48	1.384	0.97	1.97	0.839	0.49	1.45

	Unpaid maternity leave used						Paid maternity leave used					
	Overall			***Publicly insured***			***Overall***			***Publicly insured***		
	AOR	95% CI		AOR	95% CI		AOR	95% CI		AOR	95% CI	
Any state leave policy	1.228	0.88	1.71	0.862	0.53	1.41	1.365	0.98	1.89	1.199	0.71	2.02
Paid maternity leave	0.797	0.43	1.47	0.919	0.43	1.96	1.214	0.57	2.58	2.204*	1.19	4.07
Expanded FMLA eligibility	1.129	0.81	1.58	0.868	0.52	1.44	1.417*	1.01	2.00	1.062	0.64	1.77
Extended FMLA coverage	1.235	0.81	1.88	0.802	0.44	1.48	1.125	0.69	1.83	1.444	0.84	2.48

[a]Note: * p<0.05, ** p<0.01, *** p<0.001

[b]All models adjusted for age, race/ethnicity, education, marital status, insurance coverage, parity, mode of delivery, low birth weight, and percent of women in the labor force by state.

Appendix Table 2.5. Odds of maternity leave availability and use by state leave policy (N=2,708)

	Any maternity leave available						Any maternity leave used					
	Overall			***Publicly insured***			***Overall***			***Publicly insured***		
	AOR	95% CI		AOR	95% CI		AOR	95% CI		AOR	95% CI	
Any state leave policy	0.551	0.26	1.15	2.370	0.96	5.87	**1.371***	**1.00**	**1.87**	0.998	0.60	1.65
Paid maternity leave	**0.307***	**0.11**	**0.83**	**6.270****	**2.09**	**18.81**	1.422	0.76	2.67	0.916	0.43	1.95
Expanded FMLA eligibility	0.643	0.30	1.36	2.168	0.85	5.55	1.361	0.97	1.90	0.865	0.51	1.46
Extended FMLA coverage	0.731	0.31	1.74	1.524	0.49	4.74	**1.481***	**1.03**	**2.13**	0.842	0.49	1.45
	Unpaid maternity leave used						**Paid maternity leave used**					
	Overall			***Publicly insured***			***Overall***			***Publicly insured***		
	AOR	95% CI		AOR	95% CI		AOR	95% CI		AOR	95% CI	
Any state leave policy	1.260	0.90	1.77	0.848	0.51	1.41	1.314	0.93	1.87	1.210	0.72	2.04
Paid maternity leave	0.783	0.42	1.45	0.920	0.43	1.96	1.295	0.61	2.76	**2.142***	**1.15**	**3.98**
Expanded FMLA eligibility	1.145	0.80	1.63	0.858	0.51	1.45	1.357	0.94	1.97	1.072	0.64	1.79
Extended FMLA coverage	1.234	0.80	1.90	0.796	0.43	1.47	1.217	0.74	2.00	1.413	0.82	2.43

[a]Note: * p<0.05, ** p<0.01, *** p<0.001

[b]All models adjusted for age, race/ethnicity, education, marital status, insurance coverage, parity, mode of delivery, low birth weight, and percent of women in the labor force by state.

Appendix Table 2.6. Odds of 7-12 and >12 weeks of maternity duration by state leave policy (N=2,708)

	Length of any maternity leave (Base = 0 weeks)											
	Overall						***Publicly insured***					
	7-12 weeks			*More than 12 weeks*			*7-12 weeks*			*More than 12 weeks*		
	AOR	95% CI		AOR	95% CI		AOR	95% CI		AOR	95% CI	
Any policy	**1.468***	**1.03**	**2.09**	**3.251*****	**1.81**	**5.85**	1.017	0.52	1.98	0.718	0.29	1.77
Paid leave	1.071	0.58	1.96	**4.091****	**1.88**	**8.90**	2.139	0.96	4.75	0.450	0.17	1.21
FMLA eligibility	**1.637***	**1.11**	**2.41**	**2.499****	**1.43**	**4.38**	0.770	0.39	1.57	0.808	0.32	2.02
FMLA coverage	1.408	0.86	2.31	**2.986****	**1.59**	**5.49**	1.047	0.46	2.36	0.553	0.19	1.59
	Length of unpaid maternity leave (Base = 0 weeks)											
	Overall						***Publicly insured***					
	7-12 weeks			*More than 12 weeks*			*7-12 weeks*			*More than 12 weeks*		
	AOR	95% CI		AOR	95% CI		AOR	95% CI		AOR	95% CI	
Any policy	1.591	0.99	2.56	**2.759***	**1.22**	**6.23**	0.860	0.42	1.75	0.386	0.12	1.29
Paid leave	0.976	0.41	2.35	**3.190***	**1.30**	**7.82**	1.269	0.43	3.79	**0.089****	**0.02**	**0.52**
FMLA eligibility	1.298	0.80	2.11	**2.438***	**1.11**	**5.35**	0.932	0.44	1.99	0.494	0.15	1.60
FMLA coverage	1.389	0.75	2.56	**3.699*****	**1.82**	**7.54**	0.898	0.37	2.17	**0.249***	**0.07**	**0.94**
	Length of paid maternity leave (Base = 0 weeks)											
	Overall						***Publicly insured***					
	7-12 weeks			*More than 12 weeks*			*7-12 weeks*			*More than 12 weeks*		
	AOR	95% CI		AOR	95% CI		AOR	95% CI		AOR	95% CI	
Any policy	1.235	0.79	1.93	**2.055***	**1.17**	**3.62**	1.881	0.70	5.03	2.074	0.70	6.11
Paid leave	0.878	0.41	1.89	**3.161***	**1.13**	**8.87**	**7.760*****	**3.35**	**17.99**	2.160	0.60	7.72
FMLA eligibility	1.160	0.73	1.85	**2.021***	**1.12**	**3.66**	1.704	0.66	4.43	1.458	0.51	4.17
FMLA coverage	0.983	0.55	1.76	1.735	0.81	3.70	2.634	0.99	7.02	1.463	0.54	3.97

[a]Note: * p<0.05, ** p<0.01, *** p<0.001

[b]All models adjusted for age, race/ethnicity, education, marital status, insurance coverage, parity, mode of delivery, low birth weight, and percent of women in the labor force by state.

Aim 3. Workplace accommodations for pregnant employees: Associations with women's access to health insurance coverage after childbirth

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Abstract

Objective. This study evaluates the associations between workplace accommodations for pregnancy, including paid and unpaid maternity leave, and changes in women's health insurance coverage postpartum.

Methods. Secondary analysis using *Listening to Mothers III*, a national survey of women ages 18-45 who gave birth in U.S. hospitals during 2011-12 (N=700).

Results. Compared to women without access to paid maternity leave, women with access to paid leave were 0.4 times as likely to lose private health insurance coverage, 0.3 times as likely to lose public health coverage, and 0.3 times as likely to become uninsured after giving birth.

Conclusions. Workplace accommodations for pregnant employees are associated with health insurance coverage via work continuity postpartum. Expanding protections for employees during pregnancy and after childbirth may help reduce employee turnover, loss of health insurance coverage, and discontinuity of care.

Introduction

Labor force participation among women with young children (ages three or under) has nearly doubled from 34% in 1976 to 61% in 2014.[1, 2] Maternal employment may contribute positively to maternal and child health by improving the physical and mental health of women.[3, 4] Employment is associated with lower likelihood of depression, especially for women with supportive workplace environments.[3, 5] Paid maternal employment also prevents wage loss, which in turn may reduce stress and increase the amount of financial resources women have to invest into their own and their children's health.[6, 7]

Another important benefit of continued employment may be protection against the loss of health insurance following childbirth. As of 2015, 34% of working-age women in the U.S. were insured directly through their employers (i.e., not through their spouses or partners).[8] Transitioning to a different employer or out of the labor market entirely could substantially affect women's access to health insurance and health care services after childbirth. In particular, women whose maternity care is provided through public programs such as Medicaid—which finances approximately 48% of pregnancies nationally, but covers pregnant women for only 60 days postpartum[9]—may face difficulties retaining health insurance coverage. As a consequence, women may experience either insurance "churning"—transitions between different types of coverage, resulting in insurance gaps and discontinuity of care—or loss of coverage altogether.[10, 11] This is especially the case in states that did not expand Medicaid eligibility during the implementation of the Affordable Care Act, which leaves women with incomes between the Medicaid eligibility threshold and 100% of the Federal Poverty Level (FPL)—at

which point they become eligible for subsidized individual coverage through state-based Health Insurance Marketplaces—without affordable options for either public or private health insurance. Data from 2016 show that nearly one-fourth (24%) of adults in this "coverage gap" are parents of dependent children, and slightly more than half (52%) are women.[12] Maintaining health insurance coverage throughout pregnancy, childbirth, and the postpartum period plays an integral role in allowing women and infants to continue accessing needed health care services at a critical stage in the life course.[13, 14]

One potential contributing factor to women's insurance continuity after childbirth is employer support in the form of accommodation during pregnancy. Some evidence suggests women's anticipation of workplace support to be associated with employee retention and return to work postpartum, which then protects their access to employer-based health insurance.[15, 16] However, no known studies to date have directly and empirically examined the associations between employer accommodations during pregnancy, such as fewer physically demanding tasks or the anticipation of maternity leave availability, and changes in women's health insurance status after giving birth. Most research on family-friendly work environments focus mainly on policies during the postpartum period, such as flexible work hours and child care arrangements.[15, 17] While paid maternity leave has been associated with return to work, most existing studies use older or non-U.S. data, which limits their generalizability to the conditions currently faced by U.S. women of childbearing age.[18, 19]

Federal laws addressing accommodation of pregnant women in the workplace include 1) the Pregnancy Discrimination Act (PDA) of 1978, which includes pregnancy and childbirth as conditions employers are banned from discriminating against during

hiring, and 2) the Americans with Disabilities Act (ADA) of 1990, under which employers must provide reasonable accommodation for both occupationally and non-occupationally related disabilities, including pregnancy- or childbirth-related conditions.[20, 21] The 2008 Americans with Disabilities Amendments Act (ADAAA) greatly expanded the number of medical conditions that qualify as disabilities. As a result, many pregnancy-related medical conditions, even when temporary, are considered disabilities under the ADAAA and require employers to provide reasonable accommodation for women who are pregnant or returning to work from maternity leave.[22] Maternity leave is governed federally by the Family and Medical Leave Act (FMLA) of 1993, which requires employers with more than 50 employees to provide up to 12 weeks of unpaid, job-protected family leave each year to employees who have worked more than 1,250 hours during the past 12 months.[23, 24] However, strict eligibility criteria means that as many as 40% of employed women in the United States have no maternity leave available, and up to two-thirds also lack access to paid maternity leave.[25]

Protecting the health of pregnant women and families was established as a federal policy priority by several provisions of the Affordable Care Act (ACA) of 2010, which require the inclusion of maternity care as an "essential benefit" of health insurance, mandate workplace accommodations for breastfeeding, and no longer allow premium rating based on gender. As of 2015, 15 U.S. states and five cities have adopted laws requiring employers to provide reasonable accommodation to pregnant employees, and the Pregnant Workers Fairness Act, proposed to the U.S. Congress in 2013, would extend similar protections to women in all 50 states.[26, 27] In addition, the U.S. Supreme Court decided in March 2015 to remand *Young v. United Parcel Service* (UPS) to the U.S.

Court of Appeals, 4th Circuit, overturning previous district and appeals court rulings that UPS had not violated the PDA by refusing to accommodate a pregnant employee's request for tasks involving less heavy lifting during her pregnancy.[28]

Identifying workplace policies and practices that may influence women's access to health insurance after childbirth can help reduce insurance churning and gaps in coverage, producing potential long-term improvements in the health of women and children. This study uses data from a recent national survey of U.S. childbearing women to examine the association between workplace accommodations for pregnant employees—including the availability of paid and unpaid maternity leave—and changes in women's health insurance coverage postpartum, with consideration for the role of employment continuity. The results of this research are expected to produce useful information on the benefits of workplace accommodations to employers and policymakers interested in supporting women in the workplace.

Methods

Data and study population

This study uses data from *Listening to Mothers III*, a national panel survey of English-speaking women ages 18-45 who gave birth to a singleton infant in a U.S. hospital between July 2011 and June 2012. Commissioned by Childbirth Connection and funded by the Kellogg Foundation, LTM3 consists of a core survey administered October-December 2012 (N=2,400) and a follow-up postpartum survey in January-April 2013, between 7 and 21 months after respondents had given birth (N=1,072). Respondents were drawn from four online panels maintained by Harris Interactive, Inc., a

national market research firm, using probability-based sampling methods to create a nationally-representative sample. Propensity score weighting was applied to all responses to offset any potential bias stemming from internet use, as well demographic variables including age, race/ethnicity, level of education, household income, and geographic region. The sample population for this study was drawn from the postpartum survey, which contains all questions regarding women's workplace experiences prior to and after childbirth, and includes all 700 women who indicated they were working full- or part-time for an external employer during pregnancy.

Measurement

The main outcomes of interest included the loss of 1) private, 2) public, and 3) all health insurance (i.e. becoming uninsured) between the time of childbirth and the postpartum survey. Respondents were asked to characterize the primary payer for their maternity costs (private insurance, public insurance, or out-of-pocket) and their health insurance status at the time of survey. Those who had private insurance at the time of childbirth and were publicly insured or uninsured at time of survey were considered to have lost private insurance coverage; those who switched from public to no insurance were considered to have lost public coverage; and those who had been privately or publicly insured at childbirth, but were uninsured at the time of survey, were considered to have lost all coverage.

Three main predictors were examined: unmet workplace accommodations during pregnancy, availability of unpaid maternity leave, and availability of paid maternity leave. Workplace accommodation is based on a series of questions asking whether respondents needed, requested, and were granted any of the following pregnancy-related

accommodations: 1) “a change in duties, such as less lifting or more sitting;” 2) “more frequent breaks, such as extra bathroom breaks;” 3) a change in schedule or more time off, for example, to see prenatal care providers;” or 4) “some other type of workplace adjustment due to a pregnancy-related condition.” Respondents described their experiences with each type of accommodation separately; owing to limited numbers of women reporting need for each individual accommodation, we created a single dichotomous variable indicating whether any needed accommodations were not addressed by their employers. To capture maternity leave availability, we created two dichotomous variables indicating whether or not each respondent reported having unpaid and paid maternity leave benefits available.

Covariates included the following socio-demographic and birth-related characteristics: age, race/ethnicity, education, household income, Census region, marital status, return to work with the same employer, mode of delivery, parity, maternal health pre-pregnancy, and whether the infant had stayed in a neonatal intensive care unit (NICU) after birth. These covariates were selected based on existing literature,[23, 36] and each model was tested for goodness of fit.

Analysis

Sample characteristics were described using one-way tabulation. Two-way tabulation with design-based F-tests were used to identify significant differences in access to workplace benefits by each covariate. We then used a series of logistic regression models to determine the relationships between each type of workplace benefit (pregnancy-related accommodations, unpaid maternity leave, and paid maternity leave) and the three health insurance outcomes. Each insurance outcome was regressed on each

of the three workplace accommodation variables without (Model 1) and with (Model 2) the covariate indicating return to the same employer, in order to assess the degree to which employment status may have mediated or moderated the relationship between workplace accommodations and health insurance coverage. All other covariates described above were included in all regression models. All analyses were weighted to be representative of the target population and conducted using Stata 11.2 (StataCorp LP, College Station, TX).

Results

Out of 700 study participants, 31.6% needed at least one pregnancy-related accommodation that was not addressed by their employers, 70.3% had unpaid maternity leave available, and 63.9% had paid maternity leave available (Table 1). Nearly 10% of women became uninsured between the time of childbirth and survey, with 6% reporting that they lost private coverage and another 6% reporting that they lost public insurance coverage.

Respondents' experiences with workplace benefits differed significantly by socio-demographic and family characteristics (Table 2). Fewer women in the middle age ranges (25-29 and 30-34) had all their accommodation needs met ($p=0.039$) compared to women in the youngest (18-24) and oldest (35+) age categories, as did women who were married at the time of childbirth ($p=0.047$). Maternity leave availability varied largely by education and income, with highly-educated women tending to have paid maternity leave available ($p=0.045$) compared to those with a high school education or less, and high-income women tending to have both paid ($p<0.001$) and unpaid ($p=0.001$) leave available

compared to women in the lowest income tertile. Women who indicated having paid or unpaid leave available tended to return to paid employment ($p<0.001$), while those with unmet pregnancy-related accommodations tended not to do so ($p=0.007$). Return to the same employer also differed across workplace benefits, with the lowest percentage of return found among women with unmet accommodations during pregnancy ($p=0.020$), higher returns for those with unpaid maternity leave available ($p=0.004$), and highest return rates among women with paid maternity leave available ($p<0.001$).

Out of the three types of workplace accommodations we examined, only paid maternity leave availability significantly predicted insurance outcomes (Table 3). Women with paid maternity leave available were 0.43 times as likely to lose private health insurance coverage (95% CI, 0.2-0.9), 0.28 times as likely to lose public insurance coverage (95% CI, 0.1-0.9), and 0.25 times as likely to lose all health insurance coverage (95% CI, 0.1-0.5) compared to women who did not have paid leave available. Some of these associations, however, came via women's decision to return to the same employer after giving birth. When an indicator for returning to the same employer was added into the regression models, paid maternity leave availability was no longer significantly associated with loss of private health insurance, indicating that the relationship between paid leave availability and loss of private health insurance was mediated by employee retention. In contrast, the relationship between paid leave availability and loss of public coverage (such as Medicaid) or becoming uninsured is not mediated in this way. Specifically, the relationships between paid maternity leave availability and the loss of public insurance (AOR, 0.32; 95% CI, 0.1-0.9) and all health insurance (i.e., becoming uninsured; AOR, 0.32; 95% CI, 0.2-0.7) remained significant even when the models

accounted for returning to the same employer.

Discussion

More than 2.5 million of the 4 million working U.S. women who give birth each year are employed during their pregnancies.[2, 29] Our analysis shows that nearly one-third of these women are not receiving needed pregnancy-related accommodations from their employers, and over one-third have no paid maternity leave available. We also found that workplace accommodations during pregnancy, especially the availability of paid maternity leave, were significantly associated with women's likelihood of maintaining health insurance coverage postpartum. These results were robust when stratifying by full- versus part-time work status, suggesting that the association between paid leave availability and women's insurance outcomes is not confined to full-time workers.

This research builds upon previous literature indicating comprehensive maternity leave policies, including paid leave and longer leave duration, to be associated with population-level increases in women's employment rates in countries such as Norway and Sweden.[18, 30] Continuity of employment may be particularly important to the U.S. context, given the large proportion of reproductive-age women who receive health insurance coverage directly through their employers. Switching to a different employer may lead to "churning" which may bring changes in health insurance networks and care providers, thereby disrupting care continuity.[11] This theoretical possibility is supported by our analysis, which suggests that returning to the same employer mediates the association between paid maternity leave availability and loss of private health insurance—i.e., while paid leave availability significantly predicts a lower likelihood of private insurance loss,

this association may be due to women with paid leave being more likely to return to their original employers postpartum and, as a consequence, keeping the private insurance coverage they had with that employer.

In differentiating between paid and unpaid maternity leave, we also add to the extant knowledge by showing the strength of association between women's outcomes and paid leave in particular—associations that are not significant when only unpaid maternity leave is available. The U.S. remains one of only three countries in the world with no national policy guaranteeing at least some paid leave following childbirth, leaving as many as 90% of women with no access to paid family leave.[31, 32] In addition to direct associations with maternal and infant health, supportive workplace policies like the availability of paid family leave may also improve women's and children's access to health care services by facilitating continuity in women's employment and health insurance coverage at a critical time during the life course.

These findings have important implications for policy and practice. In particular, public policy approaches may ameliorate loss of health insurance coverage for women during the postpartum period, a crucial time for both maternal recovery and infant development. Compared with their international counterparts, women in the U.S. face a uniquely complex health insurance system. The ACA creates new opportunities for access to private health insurance through health insurance exchanges, employer and individual demand for coverage, and premium subsidies. Overall, these new coverage options improve the likelihood that a postpartum woman would have access to health insurance, but the transition between different types of coverage can be difficult. As many as 40% of adults experience churning between Medicaid, subsidized health

insurance coverage through state exchanges, and uninsurance in a given year, which may lead to gaps in coverage and interruptions in access to health care services, as well as incurring high administrative costs.[33, 34] Our analysis indicates that expanding family-friendly workplace policies may be one way of reducing insurance churning and gaps in coverage among women who are employed during their pregnancies. Paid maternity leave, in particular, is directly associated with retaining health insurance coverage, and may indicate both the values and priorities of particular employers as well as more robust state-level policies providing social welfare protection.

More supportive employers that offer benefits such as paid maternity leave may reap the rewards of this support via employee retention, while employees may gain more stable access to health care via continuous insurance eligibility. Though some direct costs are incurred by providing employees with paid family leave, nearly 10% of employers in states with paid leave policies, such as California, reported cost savings after paid leave legislation was passed, due to a reduction in cost shifting (i.e., employees using paid sick leave and vacation days in the absence of paid family leave).[35] For employers seeking to balance the costs and benefits of family-friendly workplace policies, the results of this study may provide useful information on factors that contribute to women's employment-related decisions postpartum.

Both employer-based and public policies that prioritize work-family balance, therefore, could play an important role in promoting continuity in health insurance coverage, access to care between pregnancies,[36, 37] postpartum mental health and adjustment,[38] and overall health and well-being.[39]

Study strengths and limitations

The *Listening to Mothers III* survey is unique in the level of detail regarding women's experiences of employer accommodations during pregnancy and provides the only recent data on a national sample of U.S. childbearing women. However, these data are limited in how they can be applied to the specific questions examined in this study. For example, survey questions asked only whether respondents' employers addressed their requests for accommodation, rather than the employer's broad policies on accommodations for pregnant employees. As previous studies show, the degree to which such accommodations are available can vary according to each individual employee's relationship with her supervisor, which potentially introduces an unobserved confounder into our analyses.[16] Future studies using surveys that include questions on both women's experiences and employer policies for workplace accommodations during pregnancy may provide detail that was beyond the scope of this study. In addition, the survey contained no information on the industry and occupation of respondents, the size and type of their employers, or spousal employment and insurance, all of which may play a role in women's decisions to return to work postpartum.[30] Recall bias is also possible, as all survey responses were based on retrospective self-report.

In addition, while the sample size was sufficient to detect statistically meaningful differences between groups for main outcomes, statistical interpretation was limited by available sample size for certain outcomes and exposures. For each of the insurance outcomes, available samples sizes (n=37 to 67), limited the power of the analyses. Additionally, sample size was not sufficient to analyze the impact of specific types of pregnancy-related workplace accommodations on employment and insurance outcomes. Changes in duties, more frequent breaks, and flexible scheduling are different enough in

terms of availability and potential impact on employment outcomes that the aggregate variable may not capture more nuanced relationships. Moreover, endogeneity may be a concern in the logistic regression models, as the same unobservable factors that influence women's choice of employer—e.g., generosity of benefits—may also determine whether they have access to insurance benefits postpartum. Future research using a prospective design may be better able to account for these challenges and produce causal estimates of the impact of workplace policies on health outcomes for pregnant employees.

Despite these limitations, the policy debates currently underway at the federal, state, local, and individual employer levels will benefit from the information this study provides. We present the first national data to examine the associations between workplace policies and health insurance coverage for women who gave birth in the post-ACA era. Our aim is for this study to serve as a basis for policy discussions and further research addressing the relationship between family-friendly work policies, employment, and health insurance coverage during major life transitions such as having a child.

Conclusion

Women who had access to workplace accommodations during pregnancy, especially paid maternity leave, were significantly more likely to keep their health insurance coverage after giving birth. Such accommodations may also influence the retention of skilled labor, a high priority for employers. Future research, possibly using larger samples and a prospective design, may provide more detailed analyses and causal estimates of the effects of workplace policies on women's access to health care postpartum, along with their overall health and well-being. Employers and policymakers

may consider measures to expand access to workplace accommodations for pregnant women, including paid maternity leave, with the aim of improving employee retention and productivity, access to health care services, and continuity of care among childbearing women in the United States.

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Table 3.1. Socio-demographic characteristics among a sample of U.S. women who gave birth in 2011-12 (N=700)

	N	% (weighted)
Accommodations and insurance		
Workplace accommodations		
Unmet accommodation while pregnant	227	30.6
Unpaid maternity leave available	507	70.3
Paid maternity leave available	444	63.9
Insurance outcomes		
Lost private insurance	45	6.2
Lost public insurance	37	6.0
Lost all insurance	67	9.8
Socio-demographic characteristics		
Age		
18-24	125	23.3
25-29	182	28.3
30-34	231	28.4
35 or older	162	19.9
Race/ethnicity		
White, non-Hispanic	469	63.2
Black/African-American, non-Hispanic	72	12.7
Hispanic/Latina	114	18.3
Other / Missing	45	5.8
Education		
High school or less	69	25.2
Some college/Associate's degree	231	29.6
Bachelor's degree	245	26.6
Graduate education/degree	155	18.7
Income		
<=$15,000 to $44,700	158	26.0
$44,701 to $75,300	233	32.7
$75,301 and above	309	41.3
Census region		
Northeast	120	19.3
Midwest	172	22.8
South	244	38.5
West	164	19.5
Married at time of childbirth	524	71.2
Employment status		
Returned to paid work	549	78.7
Returned to same employer	488	69.7

Birth-related characteristics		
Mode of delivery		
Vaginal	497	69.1
Cesarean	203	30.9
First-time mother	371	46.1
Complex pregnancy*	236	35.5
NICU stay	115	19.8

[a]Complex pregnancy refers to any of the following conditions being present prior to pregnancy: depression, Type 1 or 2 diabetes, high blood pressure, or obesity (BMI ≥ 30kg/m^2).

Table 3.2. Access to workplace accommodations by socio-demographic characteristics (N=700)

	Unmet pregnancy accommodation (n=227)	p-value	Unpaid maternity leave available (n=507)	p-value	Paid maternity leave available (n=444)	p-value
Age		**0.039**		0.347		0.551
18-24	16.8		21.5		23.4	
25-29	29.2		27.7		28.5	
30-34	37.1		31.0		30.2	
35 or older	17.0		19.8		17.9	
Race/ethnicity		0.441		0.627		0.356
White, non-Hispanic	68.7		65.4		60.0	
Black/African-American, non-Hispanic	10.2		11.5		14.1	
Hispanic/Latina	17.1		17.5		19.2	
Other / Missing	4.0		5.7		6.7	
Education		0.891		0.128		**0.045**
High school or less	23.9		23.2		20.9	
Some college/Associate's degree	28.9		27.7		29.3	
Bachelor's degree	26.5		28.0		28.4	
Graduate education/degree	20.6		21.1		21.4	
Income		0.673		**0.001**		**<0.001**
<=$15,000 to $44,700	27.9		22.3		23.3	
$44,701 to $75,300	34.3		29.9		27.1	
$75,301 and above	37.8		47.8		49.7	
Census region		0.331		0.699		0.113
Northeast	17.8		17.8		16.5	
Midwest	26.2		23.4		23.5	
South	32.9		39.7		42.2	
West	23.1		19.2		17.9	
Married at time of childbirth	78.6	**0.047**	75.8	**0.006**	72.5	0.481

Employment status postpartum						
Returned to work	70.2	**0.007**	82.7	**<0.001**	80.1	**<0.001**
Returned to the same employer	61.4	**0.020**	76.3	**0.004**	86.5	**<0.001**
First-time mother	43.6	0.509	47.6	0.370	49.1	0.121
Complex pregnancy[1]	32.0	0.349	34.9	0.722	38.4	0.128
NICU stay	21.1	0.722	19.6	0.892	21.9	0.217

Note: Bolded values are statistically significant at $p<0.05$.

[1]Complex pregnancy refers to any of the following conditions being present prior to pregnancy: depression, Type 1 or 2 diabetes, high blood pressure, or obesity (BMI $\geq 30 kg/m^2$).

Table 3.3. Insurance outcomes by workplace accommodation (N=700)

	Lost private insurance (n=45)					
	Model 1			*Model 2*[a]		
Workplace policies	AOR	95% CI		AOR	95% CI	
Unmet accommodation while pregnant	0.636	0.26	1.59	0.568	0.23	1.40
Unpaid maternity leave available	1.683	0.62	4.59	2.352	0.82	6.77
Paid maternity leave available	**0.434***	**0.21**	**0.89**	0.573	0.26	1.27
	Lost public insurance (n=37)					
	Model 1			*Model 2*[a]		
	AOR	95% CI		AOR	95% CI	
Unmet accommodation while pregnant	0.702	0.23	2.10	0.670	0.21	2.12
Unpaid maternity leave available	0.497	0.21	1.15	0.555	0.25	1.24
Paid maternity leave available	**0.275***	**0.09**	**0.85**	**0.324***	**0.11**	**0.94**
	Became uninsured (n=67)					
	Model 1			*Model 2*[a]		
	AOR	95% CI		AOR	95% CI	
Unmet accommodation while pregnant	0.626	0.29	1.36	0.577	0.25	1.33
Unpaid maternity leave available	1.085	0.53	2.20	1.331	0.66	2.68
Paid maternity leave available	**0.253*****	**0.12**	**0.54**	**0.318****	**0.15**	**0.68**

Note: *p<0.05, **p<0.01, ***p<0.001. All models adjusted for age, race/ethnicity, education, income, Census region, marital status, mode of delivery, parity, pregnancy complexity, and NICU stay.

[a]Adjusted for return to the same employer postpartum.

Aim 3: Technical appendix

The contents of this technical appendix include a more detailed description of the workplace accommodations for pregnant women and how the final variable used to represent workplace policies was created. It also gives an overview of the various indicators that were considered in attempting to represent women's employment and insurance outcomes after childbirth. Finally, it discusses the analytical challenges inherent to the analyses for this aim, including selection bias and endogeneity, along with the actions taken to address them.

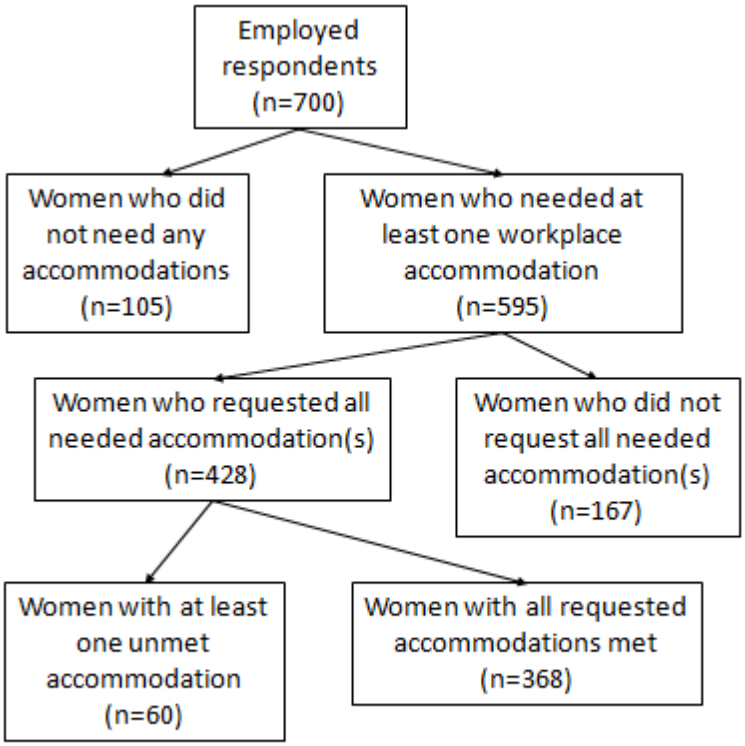
Workplace policies

Respondents to the LTM3 survey were asked about four types of pregnancy-related workplace accommodations: 1) "a change in duties, such as less lifting of more sitting," 2) more frequent breaks, such as extra bathroom breaks," 3) "a change in schedule or more time off, for example, to see prenatal care providers," and 4) "some other type of workplace adjustment due to a pregnancy-related condition." For each accommodation type, respondents were asked whether the accommodation was needed, whether respondents had requested the accommodations from their employers, and whether their employers met the request for the accommodation. Appendix Table 3.1 shows the respondents who indicated needing, requesting, and receiving each accommodation type.

Initially, the intent behind Aim 3 was to evaluate the association between each type of pregnancy-related accommodation and women's employment outcomes, in order

to provide employers and policymakers with information regarding the types of policies that are most important to employee satisfaction and retention. However, the number of respondents whose employers did not meet their requests for each type of accommodation ranged from 16 to 21; while encouraging in the broad sense that most women received the accommodations they requested, this did not provide enough variation for meaningful analysis. In addition, evaluating each type of accommodation separately did not provide any strong indication of the overall tendency of employers to accommodate pregnancy-related conditions in the workplace. Collapsing the individual accommodation types into an overall indicator (as described in the Methods section of Aim 3) provided not only more variation in the main predictor, but also a more complete representation of employer flexibility and generosity of benefits. Figure 8 shows the breakdown of all accommodations needed, requested, and granted.

Figure 8. Pregnancy-related workplace accommodations



Note: the numbers shown are unweighted; statistics presented in tables and figures use weighted percentages for national representativeness.

To complement the variable for pregnancy-related accommodations, maternity leave availability was included as an additional predictor of interest. Like pregnancy-related accommodations, maternity leave availability is a workplace policy that affects women during their pregnancies, and can therefore factor into their decisions regarding employment after giving birth.[1-3] Similar to Aim 1, maternity leave availability was initially operationalized as a single 4-category variable (no leave available, unpaid leave available only, unpaid and paid leave available, paid leave available only). Sample size and policy considerations led to separating and condensing this variable into two dichotomous variables indicating whether or not unpaid leave was available and whether or not paid leave was available. Leave availability was considered to be the most policy-

relevant variable, as employers or policymakers are able to determine whether these benefits are available to women (as opposed to leave use, which can reflect women's decisions whether to take leave independent of employer or public policy)

Employment and health insurance

Several different employment and insurance outcomes, along with their potential relationship with workplace accommodations during pregnancy, were considered. Previous research indicates that employer characteristics and the availability of benefits such as maternity leave are important contributors to women's decisions regarding employment after childbirth.[4, 5] Of particular interest were employment outcomes that may affect women's health insurance coverage, including reduced work hours or transitioning from full- to part-time employment, switching to a different employer, and leaving the labor force altogether. Ultimately, the latter two indicators were retained, as they had potential to directly predict whether women had health insurance coverage after giving birth, along with whether they experienced any changes or interruptions in their coverage. While a reduction in work hours could also play a significant role, the LTM3 data did not include specific questions about respondents' reasons for reducing their work hours. Women who voluntarily choose to assume part-time positions or exit the labor force may face different circumstances than women who are forced into doing so due to less flexible employer policies; the former, for instance, may have the option of retaining their health insurance through a spouse's employer.[6] Additionally, switching to part-time work, rather than returning to work full-time, during the first year postpartum is associated with position health outcomes for children.[7, 8] Given these considerations,

meaningful interpretation of reduced work hours and their practical significance would have been limited.

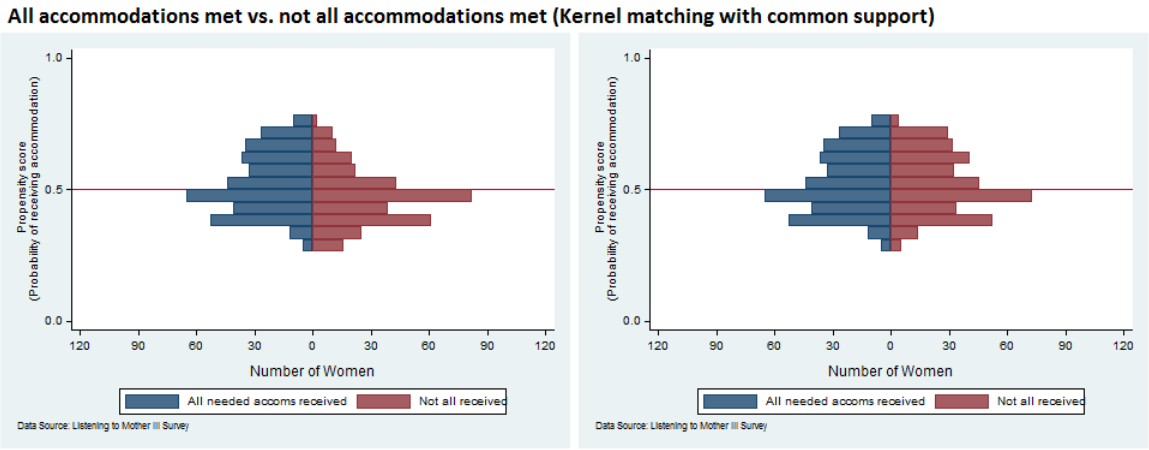
The main insurance-related outcomes considered for Aim 3 included loss of health insurance and disruptions or gaps in coverage; initially, the latter was conceived as any type of insurance churning, i.e., switching from private, public, or out-of-pocket payment at the time of childbirth to any of the other forms of insurance coverage at the time of survey. However, grouping these types of churning into a single variable lacked nuance; the experience of churning from public to private insurance coverage, for instance, is likely to be very different from the experience of churning from private to no coverage. Creating separate variables for the loss of each insurance type—private, public, and any—was deemed to be a more comprehensive approach; these outcomes were also likely to be associated with changes in employment status postpartum. Appendix Table 3.2 shows the analytical results from using the original 4-category variables for workplace policies, with reduced work hours and insurance churning as outcomes.

Analytical considerations: Selection bias and endogeneity

As with Aim 1, selection bias was seen as a potential point of concern, as women who are employed at workplaces that accommodate pregnancy-related conditions and provide either paid or unpaid maternity leave may be systematically different from women who do not work for such employers in way that are not observable in this dataset. Similar to Aim 1, propensity score matching was considered as an option for addressing any potential selection bias. However, the results from the analysis conducted with the propensity-score matched sample did not differ in terms of significance or

directionality from the unmatched sample, as shown in Figure 9 and Appendix Table 3.3. Further tests, including the Heckman two-step correction, determined selection bias to be a negligible factor in this particular set of analyses and the final models.

Figure 9. Propensity score matching by workplace accommodation



Another area of consideration in this aim was the possibility of endogeneity. As noted, the same factors that contribute to women's choice of employer—for instance, the generosity of workplace benefits or availability of social support—could also determine their decisions regarding employment and access to health insurance postpartum. Marital status, child care availability and cost, and perceptions of support from co-workers and supervisors may all factor into women's employment decisions in general, and especially after childbirth.[1-3, 5] To address issues pertaining to endogeneity, an instrumental variable approach was considered, using state-level figures for percent of women in the labor force, percent of women in professional or managerial positions, and child care costs as a percentage of women's median incomes (see Aim 2: Technical Appendix for more detailed descriptions of these variables). However, the degree to which state-level

variables could be successfully used as instruments for individual-level observations was limited. Further, Hausman specification tests showed no significant influence from endogenous variables. The final analytical models therefore employ no particular adjustment for endogeneity other than including all observable confounders as covariates.

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Appendix Table 3.1. Types of workplace accommodation (N=700)

	Needed		Requested		Granted	
	N	% (weighted)	N	% (weighted) of Needed	N	% (weighted) of Requested
Change in duties	334	50.3	212	64.3	191	91.6
More frequent breaks	493	71.2	262	56	242	94.8
Change in schedule	398	58.7	284	73.7	263	90.8
Other accommodation	230	37.3	146	62.2	130	87.3

Appendix Table 3.2. Odds of employment and insurance outcomes using original predictor and outcomes variables (N=700)

	Reduced hours			Exited employment			Insurance churning			Became uninsured		
	AOR	95% CI		AOR	95% CI		AOR	95% CI		AOR	95% CI	
Workplace accommodations												
Accommodations during pregnancy (Base = None needed)												
Needed, not requested	1.091	0.46	2.61	2.144	0.96	4.79	0.764	0.28	2.05	0.564	0.15	2.09
Requested, not all granted	1.018	0.35	3.00	1.717	0.64	4.60	1.719	0.56	5.32	0.731	0.16	3.26
Requested, all granted	1.533	0.68	3.43	1.330	0.66	2.67	1.551	0.64	3.79	0.894	0.29	2.76
Maternity leave availability (Base = No leave available)												
Unpaid leave available only	1.486	0.59	3.72	**0.247*** **	**0.12**	**0.53**	0.520	0.23	1.19	0.802	0.32	2.03
Unpaid & paid leave available	1.461	0.68	3.16	**0.119*** **	**0.06**	**0.24**	0.790	0.34	1.82	**0.246***	**0.08**	**0.76**
Paid leave available only	0.462	0.14	1.52	**0.144*** **	**0.06**	**0.34**	**0.288***	**0.11**	**0.78**	**0.204****	**0.06**	**0.68**

Note: All models adjusted for age, race/ethnicity, education, income, Census region, marital status, mode of delivery, parity, pregnancy complexity, & NICU stay.

Appendix Table 3.3. Insurance outcomes with & without propensity score matching (N=700)

	Lost private insurance (n=45)					
	Unmatched			*Matched*		
	AOR	95% CI		AOR	95% CI	
Workplace policies						
Unmet accommodation while pregnant	0.636	0.26	1.59	0.669	0.12	1.21
Paid maternity leave available	**0.434***	**0.21**	**0.89**	**0.311****	**0.20**	**0.43**
	Experienced insurance churning (n=186)					
	Unmatched			*Matched*		
	AOR	95% CI		AOR	95% CI	
Unmet accommodation while pregnant	0.702	0.23	2.10	0.560	0.13	1.07
Paid maternity leave available	**0.275***	**0.09**	**0.85**	**0.760***	**0.42**	**1.00**

Note: All models adjusted for age, race/ethnicity, education, income, Census region, marital status, mode of delivery, parity, pregnancy complexity, & NICU stay.

Policy implications and conclusions

Women in the United States face uniquely challenging circumstances with regard to employment and childbirth. Unlike all but two other countries in the world, the U.S. does not guarantee women with any length of paid maternity leave after giving birth, and the 12 weeks of unpaid leave guaranteed under the Family and Medical Leave Act (FMLA) is much shorter than that provided by most advanced industrialized countries.[1] There is also a lack of formal policies at either state or federal levels aimed specifically at protecting female employees who need accommodations in the workplace for pregnancy-related conditions. While the Americans with Disabilities Act (ADA) does extend to pregnancy,[2] interpretation of its purview varies widely, leaving many women—especially those in lower-wage or non-professional/managerial occupations—vulnerable to interruptions in employment, loss of wages, and limited access to health insurance coverage both before and after childbirth.[3, 4]

The aim of this dissertation is to evaluate the potential associations between workplace policies for women during the perinatal period, with emphasis on availability of paid maternity leave, and health-related factors. Specifically, the outcomes examined include indicators for infant health status and health care utilization; maternal physical and mental health, as well as health-related behaviors during the postpartum period; and changes in health insurance status up to 21 months after childbirth. Another outcome of interest pertained to whether policies regarding maternity leave at the state level are associated with variations in the availability, use, and duration of paid and unpaid leave across U.S. states. With individual states often leading the way to more overarching

federal policies, assessing the effects of initiatives such as paid maternity leave programs in California, Hawaii, New Jersey, and Rhode Island could provide clues as to the potential impact of similar legislation at the federal level.

Maternity leave policies and maternal/child health

Across the three papers, the availability and use of paid maternity leave is found to be associated with positive indicators for health. Women who take paid maternity leave are significantly less likely to have had their infants re-hospitalized or have been re-hospitalized themselves up to 21 months after giving birth. They are also more likely to rate themselves as doing well with exercise and stress management, which may have long-term implications for health and wellbeing. Women whose employers make paid maternity leave available are more likely to return to the same employer after giving birth, which in turn is associated with lower odds of losing both public and private health insurance coverage during the postpartum period. While these findings should be interpreted cautiously, given the limitations inherent to the analyses, the results consistently indicate that paid maternity leave in particular may have a protective influence on the health of women and infants in the first months after childbirth. In light of these benefits, employers may consider conducting internal evaluations of the potential costs and benefits of providing paid maternity leave within the specific context of their organizations. State and federal policymakers are also encouraged to invest into further research in this area, as well as making more extensive use of the existing evidence base to design policy measures that promote physical and mental health among the growing population of employed women who give birth in the U.S.

The findings in these papers may not only provide useful information to employers and policymakers considering the costs and benefits of more generous leave policies, but also form the basis of future research aimed at understanding the complex relationship between social welfare policies and individual decisions about investing into the production of health. More detailed data on family leave and paid sick leave in particular, with information on both employer characteristics and health outcomes, would shed further light onto these issues.

The role of government in maternity leave policy

Another question this dissertation aims to address is the role that public policy plays in women's ability to access workplace benefits prior to and following childbirth. Even without any formal policy for paid maternity leave, around 10% of all U.S. employers provide some length of paid family leave to their employees, and several large employers have recently adopted paid maternity and paternity leave policies.[5, 6] One argument, therefore, is that government intervention is unnecessary in such matters, as employers have incentive to provide benefits independently of state or federal mandates. The results of the analyses in Aim 2, however, confirm previous findings indicating a rapid expansion of leave uptake and duration after policies such as FMLA were implemented; further, this research shows that public policies for leave benefits—and especially paid maternity leave—have the strongest associations with increased leave availability and use among women with public insurance, i.e., those with income levels below the eligibility threshold for programs such as Medicaid. Given the existing socioeconomic disparities in access to paid maternity leave and the health benefits it may

confer, public policies, whether at local, state, or federal levels, may play a vital role in extending said access to the most vulnerable populations. Policies at the federal level in particular may also reduce regional disparities in the availability, use, and duration of both paid and unpaid leave, with precedence set by such legislation as the ADA and FMLA.

Pregnancy and childbirth represent a crucial juncture in the lifecourse, and can be a significant predictor of future health and wellbeing for both women and children. With labor force participation reaching nearly two-thirds of working-age women in the U.S.,[7] policies and practices that help women balance the demands of work and family are increasingly topics of public discourse. This dissertation is aimed at producing rigorous, new information in the U.S. context on the potential influence of family-friendly workplace policies on maternal and infant health, healthcare utilization, and access to health insurance coverage. In addition to the benefits offered by individual employers, state- or federal-level protection of such allowances as paid maternity leave and pregnancy-related accommodations in the workplace may contribute to improvements in the health of women and infants, especially at the lower end of the socioeconomic spectrum. Beyond their specific effects, policies that provide or promote family-friendly work environments may also signal a shift in cultural or societal values toward the balancing of interests between employers and workers.

Recommendations for future research

The findings in this dissertation should be considered in light of their limitations; they do, however, provide a point of consideration for decision-makers in both public and

private sectors, as well as impetus for further efforts at data collection and analysis. One of the strongest areas of recommendation, in fact, is for more comprehensive data on women's experiences in the workplace pre- and postpartum, alongside detailed indicators for health and heath care utilization. Perspectives from employers, health care providers, and spouses or partners would also provide a more complete picture of the unique demands on parents after the birth or adoption of a child and their potential impact on health and wellbeing in both the short and longer terms. Data that allow for longitudinal, subgroup, or qualitative analysis, among others, would build on the work completed in this dissertation to provide more clarity into the interactions between public and private provision of workplace accommodations during the perinatal period and the health of women, children, and families throughout the U.S.

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