Social Costs of Work Disruptions: Evidence from Physicians and their Patients

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Abstract

Work disruptions are common and often long-lasting among women, which imposes substantial costs on workers (e.g., foregone earnings) and firms (e.g., search frictions). Do consumers also shoulder some of the costs of these interruptions? To study this question, we investigate the impact of physicians' births — a large shock to women's productivity — on their work volume, continuity of patient relationships, and patients' access to care, using administrative insurance claims data from California. We find that female physicians dramatically reduce their work output in the quarter following a birth, and then largely return to work, with only a modest persistent reduction in work. Nevertheless, this interruption generates substantial negative spillover effects for their child patients. Children whose primary care physicians become mothers are 23% less likely to see their usual physician for up to 2 years afterwards, and experience a persistent 50% reduction in vaccination claims. These results suggest that there may be a scarring effect of the interruption on patients, and that there may be substantial benefits of policies that reduce work disruptions.

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1 Introduction

Work disruptions are common and often long-lasting among women, which results in substantial costs for workers and firms.[1] These labor market costs could be potentially offset by the benefits of work flexibility – improved work-life balance, for workers and stronger worker retention, for firms. However, one concern is that these interruptions could create frictions that spill over to *consumers*, creating *external, social* costs that are not taken into account in worker-firm decisions. Consumers may be harmed, for instance, if replacement workers are imperfect substitutes for a missing worker, which could lead to less trust, gaps in communication, or lapses in service. These issues may be amplified in contexts where a consumer's experience depends more on her history with a provider, or where replacements are less readily available. Yet there is little evidence on whether worker absences affect downstream consumer outcomes.

In this paper, we examine how a primary care physician's childbirth — a large disruption to women's work — affects her work volume and patients' health outcomes over the short- and medium-run. The medical setting provides a useful context for this investigation because provider continuity has been linked to improved patient outcomes, so interruptions to these relationships may have important consequences for patients' health. At the same time, many medical practices have made efforts to improve care coordination across providers, e.g. by adopting electronic records and formalizing systems for hand-offs, which could make worker substitutions more seamless. These opposing forces make it unclear whether a *modest* or *anticipated* interruption in access to a physician, such as from a childbirth, would negatively affect patients.

We apply a triple-differences approach to investigate the impact of women's work interruptions around childbirth, using administrative health records from the Medicaid program in California and Vital Statistics birth records. Our empirical strategy compares the outcomes of patients whose provider becomes a new mother and whose provider becomes a new father, relative to the gap in outcomes between patients of matched non-parent female and male providers. This allows us to isolate the impact of the work interruption among new mothers from other time-varying changes in outcomes that may coincide with childbirth or may differ for patients of female physicians.

We have four main sets of results. First, we document that childbirth leads to a substantial, but short-lived, disruption in the work of female physicians relative to male physicians. In the first quarter following childbirth, the volume of office visits for Medicaid beneficiaries declines by 90%, which includes a 32 percentage point decline in the likelihood of submitting *any* claims. However, these large effects on women's work output are temporary. In the medium-run (1-7 quarters after childbirth), we find that the total volume of office visits has recovered nearly to baseline levels, and that the likelihood of billing any claims has fully rebounded. We validate these patterns using a

[1] For evidence on the costs of lost work experience for women, see, for example, Mincer and Polachek (1974), Blau and Kahn (2017), Kuka and Shenhav (2024); and for replacement costs for firms, see Gallen (2019); Jäger and Heining (2022); Ginja, Karimi and Xiao (2023); Brenøe et al. (2024).

survey of physician's hours, which ensures that our findings do not reflect substitution to or from Medicaid enrollees.

Second, we show that child patients have less access to health care after their primary care provider (PCP) becomes a mother. Children are 40 percentage points less likely to see their *attributed* PCP in the first quarter after their physician becomes a mother. Further, children experience a persistent 11 percentage point reduction in the likelihood of having any appointment with their attributed provider for up to 2 years following the birth. Thus, the initial disruption in their source of care leads some patients to permanently rupture their PCP relationship. Children eventually substitute to other providers, but not immediately; children's total office visit claims (with any provider) decline by 10% in the quarter of the PCP's childbirth, and then recover over the medium-run.

Third, we find that reduced access to care and rupture of their patient-doctor relationship leads to persistent reductions in vaccination claims for children. This includes a reduction in routine immunizations as well as a decline in seasonal flu vaccines, so children become more vulnerable to a range of preventable diseases. This suggests that there may be a "scarring" effect of the initial physician interruption. We find that the adverse impacts on children scale with the baseline demand for care, including larger impacts for patients who are younger (under 6) or who have a longer history with their attributed PCP.

Fourth, and in contrast to the effects on child outcomes, we find that a female PCP's childbirth has smaller effects for adult patients. Adult patients substitute to other providers during the quarter following the PCP's birth, and then return to their PCP afterwards. We find no effect on vaccinations, pharmacy claims, emergency department use, or Medicaid enrollment. This suggests that adults may be less susceptible to the adverse effects of an interruption in provider availability.

We also provide several pieces of evidence to validate the interpretation of our results. First, event studies of patient outcomes before and after childbirth verify that there was no change in care utilization leading up to a PCP's pregnancy. Second, we show that patients of new parents and non-parents are balanced in demographic characteristics and health care utilization at baseline, which alleviates concerns about potential selection across these physicians. Third, our results are robust to alternative specifications, other measures of patient outcomes, and similar across patient subgroups that vary by baseline demand for care.

Our findings suggest that parenthood not only generates asymmetric career costs across female and male *workers*, but also asymmetric costs for their *clients*. Because women account for a growing share of the medical work force — the majority of medical students and 37% of physicians — these costs may have significant cumulative effects on the professions' output. Thus, policies that could reduce child-induced lapses in work (such as child care subsidies) or facilitate hand-offs between providers for vulnerable patients (particularly children), could have significant social benefits. Our analysis focuses on primary care physicians; however we hypothesize that these costs may extend

to other fields where relational capital is an important input to outcomes, such as teaching, mental health, social work, or law – which each have large shares of female workers.

These results provide new evidence that becoming a parent has costs that extend beyond the worker — to *consumer* outcomes. This complements a broad literature in labor economics demonstrating that motherhood depresses women's labor market outcomes (e.g. Lundborg, Plug and Rasmussen, 2017; Kleven et al., 2019; Cortés and Pan, 2023) and imposes costs on firms due to difficulties substituting for the lost labor (Gallen, 2019; Jäger and Heining, 2022; Ginja, Karimi and Xiao, 2023; Brenøe et al., 2024). The most closely related paper to ours, Friedrich and Hackmann (2021), shows that a large-scale absence of nurses in Denmark (due to the introduction of a parental leave program) adversely affected outcomes of hospitalized patients. While Friedrich and Hackmann (2021) focuses on a large, one-time shock affecting the entire labor market, we study how a common, short-term absence of a patient's PCP affects outpatient care among low-income children and adults. We find that a female physician's childbirth adversely affects her patients, and that these impacts outlast the period with large reductions in her work output.

We also build on prior work in health care highlighting the importance of longitudinal patient-PCP relationships and trust (Rodriguez et al., 2007; Agha, Frandsen and Rebitzer, 2019; Mainous et al., 2001), by investigating how interruptions in access to a PCP affects patient outcomes. While previous research on permanent PCP exits found large disruptive effects and increased adverse health outcomes for adult patients (Sabety, Jena and Barnett, 2021; Staiger, 2022; Sabety, 2023; Zhang, 2022), we find that common, *temporary* PCP interruptions have no impact on adult patients' care utilization or health outcomes. Further, these prior papers focus exclusively on care for adults; we extend our focus to children, and find that PCP's childbirth reduces children's access to care. Finally, we contribute new evidence that fostering longitudinal relationships between children and primary care providers may be an effective strategy for increasing vaccination rates, consistent with a growing literature emphasizing the role of trust in overcoming vaccine hesitancy (Alsan, Garrick and Graziani, 2019; Nowak et al., 2021).

Taken together, our findings suggests that common, short-term interruptions in PCP access are costly for children, leading to persistent reductions in take-up of high-value preventive care. This suggests that policies that alter the duration of parental work interruptions — such as paid family leave — should also include provisions to improve consumers' ability to substitute to alternative providers. Prior evidence on PCP exits suggests that direct outreach to patients in anticipation of a retirement can help reduce disruptive effects (Zhang, 2022); similar approaches may be helpful for temporary physician leaves as well. Improvements in childcare infrastructure that reduce leave duration or increase work output after a return to work may also mitigate these costs.

2 Setting and Data

Our analysis brings together detailed data on physician births, patient health care utilization, physician work, and physician characteristics from multiple sources. To provide context for our empirical work, we begin by describing the Medicaid insurance program in California (Medi-Cal), which provides the main outcomes and sampling frame for our study.

Medi-Cal Program Medi-Cal provides insurance to over 14 million low-income individuals in California, including roughly 40% of all children, 50% of individuals with disabilities, and 20% of workers in California (Tatar and Chapman, 2019). Eligibility for the program depends on family income, as well as categorical factors, such as immigration status, disability, and age (which contributes to the high rates of youth participation).[2] This setting provides three main advantages for our empirical analysis. First, Medi-Cal accounts for roughly one-sixth of all Medicaid participants nationally, which makes it a relevant context for analyzing potential strategies to improve outcomes in the national program (Centers for Medicare and Medicaid Services, 2024). Second, the large scope of the program ensures that we have a thick network of patient-provider relationships. Third, California Medicaid enrollees often experience difficulty finding an accepting pediatrician or adult primary care provider (Pintor et al., 2019; Galbraith et al., 2005; Melnikow et al., 2020), perhaps due to low reimbursement rates (Polsky et al., 2015; Alexander and Schnell, 2024) and high administrative burden (Dunn et al., 2024). This context may amplify the disruptive effects of physician leaves, given the barriers to establishing care with a substitute provider.

Medi-Cal Insurance Claims Our core data are insurance claims from Medi-Cal from 2012-2019, which were provided by the California Department of Health Care Services. Our data include the full panel of Medicaid claims and enrollment dates for patients who have ever seen (i) a primary care provider (PCP) who became a new parent between 2007 and 2017 or (ii) a PCP in a matched sample of physicians. We broadly define PCPs to include physicians who specialize in family practice, pediatrics, and internal medicine. We discuss the process for constructing this sample in Appendix A1. We estimate that this sample of patients covers roughly 60% of all enrollees during this period.[3]

To identify patients who could be affected by a physician's childbirth, we assign a patient to their likely PCP based on the internal medicine, family practice, or pediatric physician who delivered a plurality of their visits (unique days with E&M services) over a 12 month period preceding the birth event (months -14 to -2).[4] This follows the standard attribution procedure used in past work,

[2] For a detailed overview of the Medi-Cal program, see Tatar and Chapman (2019).

[3] For example, our data for 2018 include 8 million total patients, 3.4 million of which are under age 20. This amounts to 62% of the 13 million total enrollees, and 62% of the 5.5 million enrollees under 20 in that year (California Department of Health Care Services, 2018, 2020)

[4] We do not consider the two months leading up to the birth when attributing patients to PCPs, in case some PCP

such as Agha et al. (2022) and Pham et al. (2009).

From the Medicaid claims, we construct quarterly measures of physician work, as well as quarterly measures of patient care utilization. To measure physician work, we count the physician's total number of claims for outpatient evaluation and management (E&M) services, or "office claims", for short.[5] We also create a binary indicator for whether the physician has any office claims during the quarter, which we interpret as a measure of physician leaves.

Next, we construct four main measures of care volume and quality for each patient, which we calculate quarterly. First, we count each patient's total number of office claims, which we use as a proxy for physician-patient interactions. Second, for each claim, we measure the familiarity of the patient with the provider on the claim, defined as the number of weeks that have elapsed since their first observed claim together. A patient's quarterly measure of physician familiarity is defined as the mean of this familiarity metric over all the patient's office claims within the quarter; quarters with no office claims have missing values of this familiarity measure. Third, to measure different types of patient care, we count the total number of claims for vaccinations, prescriptions, and emergency room care. Fourth, we measure whether a patient was ever enrolled in Medi-Cal during the quarter using their enrollment dates. This allows us to investigate patients' attrition from Medicaid as a potential response to provider availability.

Vital Statistics We obtain the timing of physicians' childbirths from the 2007–2017 California Vital Statistics Birth Records Data, which includes documentation for each child born in California. Birth records include the date and location of birth, parent names, and parent occupations for all children born in California. We identify physicians as parents based on their self-reported occupation, and link these records to physicians in the Medi-Cal claims using a fuzzy match of mother's or father's names to National Provider Identifier (NPI) listed in physician registries. We define non-parent physicians as those without a birth in California over 2007–2017. We provide further detail about the NPI match and identification of non-parents in Appendix Section A1. Due to data limitations, our identification of non-parents is imperfect (i.e., some doctors who we call "non-parents" may in fact be parents); we discuss the implications of this for our research design in Section 3.

California Physician License Survey We supplement the insurance claims with information on physicians' weekly hours of work from the Medical Board of California Physician and Surgeon License database (2010-2022). Physicians are required to renew their medical license every two years, and are surveyed at the time of renewal about their usual weekly hours dedicated to patient

mothers adjust their practice volume in late pregnancy. To improve our PCP attribution, we require that patients under the age of 18 only match to PCPs who are family practitioners or pediatricians, and that patients over the age of 18 not match to a pediatrician.

[5] We define E&M services using CPT codes 99202-99215 as well as billing codes 00018, T1015, and 00001-00003 which are commonly used by Federally Qualified Health Centers in California to bill E&M services.

care. The license data also include medical school graduation year and gender, which we use as covariates in our physician matching process. The license data do not contain NPIs, so we perform another fuzzy name match to link physician records in that database with the Medi-Cal claims.

Physician Directory Data We use a variety of additional sources to populate physician characteristics. We use the National Plan & Provider Enumeration System (NPPES, 2007-2022) to obtain physician specialty codes and gender and graduation years for physicians who do not appear in the license survey. We use the Center for Medicare & Medicaid Services (CMS) Doctors and Clinicians National Downloadable File (2015-2022) to fill in gender for remaining physicians.

3 Empirical Strategy

To quantify the impact of women's work interruptions after childbirth, we follow Kleven et al. (2019) and others in using an event study approach. Specifically, we compare the outcomes of women and men physicians and their patients, in the months leading up to and following a birth. We then compare this difference to the gap in outcomes among a set of matched non-parents, which allows us to control for potential time-varying gender-based differences unrelated to children.[6] This triple-difference approach allows us to estimate the differential effect of childbirth among women – separate from the broader effects of parenthood or being a woman PCP.

We estimate:

$$y_{igpt} = \alpha_i + \sum_{j=-7}^{7} \gamma_j \text{Mother}_i \times \mathbb{1}(t = j) + X_{pgt}\eta + \varepsilon_{igpt}, \tag{1}$$

where y_{igpt} is the outcome of physician i, or his or her attributed patient, who is gender g and belongs to parent group p (parent or non-parent) and is observed t quarters since childbirth. $Mother_i$ is an indicator for becoming a mother during our sample. The coefficients of interest are the γ_j's on the interaction between the indicator for becoming a mother and time relative to childbirth, $\text{Mother}_i \times \mathbb{1}(t = j)$. These coefficients trace out the change in the gender gap between physicians who become mothers and fathers in each quarter around a first childbirth, relative to the omitted quarter ($t = -5$). For physicians who become parents, t is the number of months that have elapsed since childbirth divided by 3. For non-parents, t is determined by the matched parent.

To isolate the impacts on mothers, we control for the two-way interactions between gender, event time, and parent status with a flexible set of fixed effects. First, we include individual fixed effects, α_i to absorb any time-invariant differences in outcomes, including in one's physical health, preferences for care, or location of care. Second, we include the vector X_{pgt}, which includes the standard two-way fixed effects for gender-by-event-time and parent-by-event-time, modified to

[6] We discuss the matching process in Section 3.1.

allow flexibility in these effects across individuals. Specifically, we allow each of these coefficients to vary with (i) the calendar quarter and year of childbirth and, for the patient analysis, (ii) the length of a patient's relationship with a physician (at baseline). This addresses potential concerns that childbirth may be more prevalent in particular seasons or years, or may be correlated with the number of previous visits with a patient, which could affect subsequent patient outcomes. In practice, these modifications to the standard model have little effect on our results (see Section 8). For conducting inference, we cluster the standard errors by physician.

To summarize the event study results, we use a triple-difference model:

$$\begin{aligned} y_{igpt} =& \alpha_i + \beta_1 \text{Mother}_i \times \text{Quarter } 0 + \beta_2 \text{Mother}_i \times \text{Quarters 1-7} \\ &+ X_{pgt}\lambda + \epsilon_{igpt}. \end{aligned} \tag{2}$$

The treatment effects of childbirth on the gender gap are summarized by β_1 and β_2, which give the impacts in the short run (quarter 0) and medium run (quarters 1-7), respectively. This allows us to separate between the immediate effects of having a child, which might include recovery from delivery and take-up of paid leave benefits, and more persistent impacts on behavior.

The identifying assumption of this research design is that childbirth is not correlated with a differential trend in the gender gap in outcomes among parents relative to non-parents. Our main evidence for this assumption comes from our event study analysis. Specifically, we test for the significance of the pre-pregnancy coefficients ($t < -4$) to check whether mothers exhibit different trends than fathers *prior* to having children. Similarly, we check whether the *patients* of mothers exhibit different trends than *patients* of fathers *prior* to the arrival of children. We also show a balance table that tests for similarity of observable characteristics between patients of parents and matched non-parents. Importantly, the balance table includes covariates that are not targeted in our matching process, which allows us to validate the comparability of our treatment and comparison groups.

Because we are not able to perfectly identify non-parents (as we discuss in Section 2), this introduces measurement error in our treatment assignment. This stems from three sources of parenthood that we do not observe: (i) some doctors may be "already-treated," by having older children born before 2007 (so at least 5 years old during our sample); (ii) some doctors may have births outside of California; and (iii) some doctors may be treated in a later year, in 2018 or 2019. We do not expect this misclassification to meaningfully affect our results. We require non-parents and parents to be in the same medical school cohort, so it would be uncommon for the non-parent in the match to have had a child (at least) 5 years earlier.[7] We also require physicians in our sample to be actively practicing in California over the study period, which makes it unlikely that they have

[7]Further, the impacts of parenthood on careers seem to stabilize by the time that a child is five years old, so older parents are unlikely to have strong changes in their practice volume during our sample (e.g. Lundborg, Plug and Rasmussen, 2017; Kleven et al., 2019).

a birth in another state.[8] Finally, while there may be some doctors who become parents in a later year, these events do not appear to affect the work trends among non-parent physicians (see, e.g., Appendix Figure A2), which suggests that they are infrequent.

3.1 Sample Construction and Characteristics

Sample construction and matching We construct our analysis sample in two steps. First, we use coarsened exact matching to identify a matched sample of non-parent physicians who are similar to parent physicians. This matching approach has been used previously to establish comparisons between workers in other highly skilled professions, such as elite scientists (Azoulay, Graff Zivin and Wang, 2010) and surgeons (Sarsons, 2024). We establish these links by matching one-to-one exactly on physician gender, specialty, graduation year, and coarsely on the size of their patient panel. Appendix A2 describes the matching procedure in detail. This produces a sample of 2,976 parents and matched non-parents.

Sample characteristics Table 1 provides descriptive statistics on the patients in our analysis sample, prior to a PCP's childbirth, separately by whether the patient was a child or adult at the time of their PCP's childbirth. Several key differences between child and adult patients emerge from the table. First, younger and older patients have distinct demographic characteristics: children are more likely to be Hispanic (64% vs 39%); less likely to be white (11% vs 21%); and less likely to be female (49% vs 64%). Second, adults have more severe health conditions than children, as indicated by having a higher hierarchical condition category (HCC) risk score.[9] Third, older and younger patients receive different kinds of care: children have more vaccination claims (0.37 vs 0.10), but have fewer office claims and prescriptions, and are less likely to use the emergency room. Children also tend to see physicians with whom they have a longer history (18 weeks vs 15 weeks). Motivated by these distinct backgrounds and health demands across age groups, we will study adults and children separately in our empirical analysis.

We assess balance in the characteristics of treated and comparison patients in Appendix Tables A4 and A5, for children and adults, respectively. Overall, the patterns in race, gender, and health-care utilization look very similar across these groups. Importantly, none of these characteristics are used in the matching process, so these are all non-targeted moments. This provides reassuring evidence for our empirical strategy comparing these groups over time.

[8] We also drop all physicians from the sample who had a non-unique name match to a physician in the birth records, which makes it unlikely that we misassign treatment due to having a duplicate name.

[9] The HCC score was developed by the Centers for Medicare and Medicaid Services to predict patients' future health care costs on the basis of their claims history.

4 Results

5 Impacts on providers

To establish a disruption in patients' access to a physician, we begin by examining the impact of childbirth on the work volume of physicians. Figure 1 presents the coefficients from our triple-difference event study for the physician's total number of office claims (Panel A) and whether she had any office claims during the quarter (Panel B). Panel A shows that mothers, relative to fathers, sharply reduce their office claims in the quarter of childbirth. Mothers fully return to baseline levels of work by quarter 4, but then appear to reduce claims modestly in the following quarters. Some of the reduction in work in the second year may be driven by new disruptions from the birth of a second child (Adams, Jensen and Petrongolo, 2024). Importantly, the coefficients *prior* to childbirth are all small and statistically insignificant, indicating that mothers do not pull back from work in anticipation of having a child.

Panel B of Figure 1 shows that mothers' likelihood of billing any claims also dips markedly after childbirth. However, unlike the effects on total claims, mothers' participation recovers quickly in the subsequent two quarters, and remains at baseline thereafter. Thus, mothers do not appear to leave the medical profession after having a child.

Table 2 summarizes the effects on mothers' claims volume in the short- and medium-run. Column 1 shows that mothers' office claims fall by 133 in the quarter of birth ($P < 0.01$), which is a 90% decline relative to the mean. Consistent with the event study, we find that mothers' claims largely rebound in quarters 1-7, but, suggestively, remain 48 claims below baseline ($P < 0.10$). Column 2 shows that mothers are 32 percentage points (p.p.) less likely to have any claims in the quarter of childbirth (a 42% decline). This fades to a statistically insignificant 1.7 p.p. effect in the following quarters, reinforcing our conclusion that mothers' participation in the work force is unaffected by childbirth.

Underlying the triple-differences approach, we are simultaneously comparing new mothers to other women, and new fathers to other men. In Appendix Figure A1 and Appendix Tables A2 and A3, we report difference-in-differences analyses separately by gender. Consistent with our interpretation that the disruptive effects of childbirth are experienced primarily by mothers, we find similar patterns in the women's difference-in-differences analysis to those reported in the triple-difference above. Fathers show no evidence of a work disruption around the time of the birth. Both mothers and fathers increase their likelihood of billing any Medicaid claims in quarters 1-7 following a birth, suggesting parenthood may strengthen their attachment to the Medicaid labor force. This could occur, for example, through income effects that affect both parents. By focusing on the triple-difference analysis, we are able to separate the disruptive effects of parenthood for women, net of any general income effects experienced by both men and women.

Anticipating our patient analysis, we next study whether the impacts on mothers' work vary by

whether her patients are *children* (columns 3-4) or *adults* (columns 5-6). Responses may vary across these groups, for instance, if pediatricians tend to use more team-based care, are more committed to their patients, or prefer to spend more time on leave. We classify physicians by whether they have any attributed patients in each group, and weight our estimates by the share of the physicians' patients in the group. Overall, we find that responses are similar for mothers who have younger and older patients. We see that mothers' office claims and participation fall substantially in the quarter of childbirth, and largely rebound in the following quarters. This suggests that any difference in the impacts on child versus adult patients is unlikely to reflect differences in the interruption in physician access.

Do the effects on mothers' claims represent changes in total work *effort* or substitution away from *Medicaid* patients? To distinguish between these, we examine impacts on physician's *total* weekly hours spent on patients. We find that the effects on patient hours are largely consistent with the patterns in claims above, including by specialty: new mother's hours decline in the year of childbirth, but rebound in the subsequent year (see Appendix Tables A6 and A7).[10] This suggests that the decline in mothers' claims is likely to reflect changes in total work — and not just a shift away from Medi-Cal patients.

6 Impacts on patients

Having established that childbirth produces a strong work interruption for physician mothers, we next turn to impacts on patient outcomes. We study the effects of this disruption first on child patients and then turn to adult patients. Throughout, we focus on outcomes in five categories of health care utilization: (i) encounters with a health care provider; (ii) preventive care (vaccinations); (iii) pharmacy claims; (iv) emergency care use; and (v) enrollment in Medi-Cal. This allows us to detect potential effects of a physician's absence on different margins of patient care.

6.1 Impacts on children

Figure 2 presents our main event study results for children, with corresponding triple-difference estimates in Table 3. Panel A of Figure 2 shows affects on a patient's office claims with her attributed PCP. Leading up to a female PCP's pregnancy, children's office claims are steady, consistent with the stable work among PCP's shown in the previous section. However, children's PCP claims fall substantially after their PCP becomes a mother. Children have 0.4 fewer PCP claims in the quarter of childbirth (column 1 of Table 3), an 84% decline relative to the pre-childbirth mean, and continue to have reduced PCP visits in the following quarters. Over the medium run,

[10] Because we only observe the year in which the survey was completed, and not the month or date within the year, we adapt Equation 2 to be at the annual level.

children have 0.1 fewer office claims per quarter, up to seven quarters after the birth event.[11]

Panel B of Figure 2 shows that children also have fewer *total* office claims after their PCP becomes a mother. Children reduce office claims the most in the quarter that their PCP becomes a mother (by 0.2 claims), but there are also less precisely estimated reductions in claims in the surrounding quarters. Placing the magnitude of this effect in perspective, the immediate fall in total office claims is roughly half as large as the decline in PCP office claims (column 2 of Table 3). This suggests that children are able to substitute half of their foregone visits with their usual PCP to other providers. We do not find an offsetting increase in claims in subsequent quarters, implying that this is not simply a *delay* in care. This inability for children to find alternative care could reflect difficulty obtaining an appointment with other PCPs or reticence to see a new provider.

To complement the results on visit frequency, we also investigate whether PCP childibrth affects the patient's familiarity with the providers they see, as a proxy for the strength of the patient's relationship with their providers. We measure familiarity as the number of weeks since a patient-provider pair's first visit together, averaged across all the patient's visits in that quarter. We find that children's familiarity with the physicians they see declines by 9.6 weeks in the quarter of childbirth, which is a 38% decline relative to the pre-childbirth mean (column 3 of Table 3). The effects on physician familiarity remain negative over the medium-run, although the estimates become less precise.

Panel C of Figure 2 shows that children's decline in office visits is accompanied by fewer vaccination claims after their PCP becomes a mother. We find that children's immunizations fall precisely in the quarter that their PCP becomes a mother, and remain at this lower level over the next seven quarters. The immediate decline in immunizations is 0.25 claims, which equates to a 63% reduction relative to the mean (column 4 of Table 3). This suggests that the disruption in access to one's PCP leads to a meaningful and long-lasting change in children's preventative care. Panel D shows that the decline in children's immunizations is largely concentrated among *routine, non-seasonal vaccinations*, which protect against more severe illnesses. These routine vaccines decline by roughly 0.2 claims in the short- and medium-run, which amounts to a 62% decline (Table 3 column 5). We also find similarly large proportional declines when we examine other kinds of preventative care, such as lead screening tests (see Appendix Table A8). Hence, children have a substantial drop in access to routine, preventive care, and thus may be less protected against a range of important health harms.

In contrast, we find little effect on prescription drug fills (which include treatment for chronic health conditions) or on use of the emergency department (Table 3 columns 6–7). This could suggest that patient-doctor relationships are particularly important for preventative care rather than curative care, consistent with past research that behavioral hazard reduces demand for preventive

[11] Notably, we find a small, imprecise decline in children's PCP claims in the last trimesters of pregnancy, indicating that the triple difference (which includes the doctor's pregnancy as part of the untreated period) may understate the extent of the care disruption.

care (Baicker, Mullainathan and Schwartzstein, 2015) and patient's trust in their physician may be an important predictor of vaccine takeup (Alsan, Garrick and Graziani, 2019). We also do not find any effects of childbirth on enrollment in Medi-Cal (column 8), which confirms that the measured reductions in care do not reflect attrition from the Medicaid program.

6.2 Impacts on adults

Distinct from the effects on children, Table 3 Panel B shows more muted and transitory effects of a female PCP's childbirth on adult patients' care utilization. Adult patients have 0.33 fewer PCP office claims in the quarter that their physician becomes a mother, but this effect fades to zero in the subsequent quarters (column 1). Further, there is no impact on *total* office claims, although physician familiarity declines, suggesting that the decline in PCP office claims is fully offset by visits to alternative providers (columns 2-3). We also do not find any impact on vaccinations, prescriptions, or emergency claims (columns 4-6). We find similar patterns in the event studies (Appendix Figure A3).

Overall, this suggests that adults are able to more easily substitute to other providers after a PCP interruption, and that the change in physicians does not appear to affect their health care utilization. This could reflect the fact that adults in Medi-Cal tend to be in worse health than children, so they may have better-established care plans or may be willing to exert greater effort to find a replacement physician. We will further explore the role of patient demand and provider relationships in the heterogeneity analysis below.

7 Heterogeneous effects & mechanisms

In this section, we probe the aggregated results described above to explore whether effects depend on children's baseline attachment to care, and to investigate separately the contribution of mothers' and fathers' work changes around childbirth. First, we test for heterogeneity in our main results on patient outcomes, depending on the length of the patient's PCP relationship, care utilization and age prior to the birth. Second, we unpack the triple-difference results to separately analyze the effects of motherhood versus fatherhood. This allows us to explore the possibility that patients of new fathers receive *more intensive care*, which leads the patients of mothers to comparatively fall behind.

We test for heterogeneity in patient responses using two proxies for patients' demand for care (age and baseline claims) and one proxy for physician attachment (length of relationship). Specifically, we re-estimate equation 2 for six subsamples defined by having a "high" or "low" value of each of these three categories. We plot the coefficients for the short (blue circles) and medium run (red trianges) in Figure 3. The estimates are ordered by the average value of the outcome at baseline (shown on the x-axis), so we can visualize how the effects compare to patients' initial

utilization.

For total office claims (displayed in Panel A), we find limited evidence of heterogeneous effects by subgroup. Patients with greater baseline use of care generally have larger estimated effects of their PCP becoming a mother in both the short and medium run, but effects in different subgroups not statistically distinguishable from one another. Turning to impacts on vaccination claims (displayed in Panel B), we find substantially larger effects on the youngest patients, who also receive more vaccinations on average. As in the pooled sample analysis, we find that the negative impacts on on vaccinations are highly persistent in these subsamples, as indicated by the overlapping coefficients for the short and medium run.

To separate the effects of changes in fathers' and mothers' work, we decompose our main results into two separate difference-in-differences by physician gender. Overall, the evidence suggests that patients of new fathers may ramp-up care slightly, but these effects are typically imprecise and account for a small share of our results (see Appendix Table A9). For this reason, we interpret the decline in the patient care among new mothers as primarily a response to the physician interruption.

8 Robustness

We test the sensitivity of our results to three changes in our empirical specification. First, we experiment with estimating treatment effects relative to the *pre-pregnancy* period, rather than the *pre-childbirth* period.[12] This allows for potential anticipatory effects of childbirth that occur during the child's gestation. Appendix Table A10 shows that we find similar effects on patients with this specification. This is consistent with the small and insignificant estimated effects of PCP's pregnancy on patient care outcomes.

Second, we study the effects of removing our controls for doctor relationship and calendar time from X_{pgt}. The remaining controls in X_{pgt} are two-way fixed effects for event-time interacted with physician gender and parent status. Table A11 shows that this has little impact on the results, consistent with the fact that our sample is well-balanced on these characteristics at baseline.

Finally, we investigate robustness of our estimates to potential treatment effect heterogeneity by applying the imputation-based triple-differences estimator developed by Borusyak, Jaravel and Spiess (2024). Appendix Table A12 shows that our results when we use this method are consistent in both magnitude and precision to our main estimates. This suggests that common concerns with conventional fixed effects triple-differences implementations, such as negative weighting of long-run treatment effects and forbidden comparisons of early-treated and late-treated units, do not play a large role in our main results.

[12] We do this by adding interactions between fixed effects for each trimester of pregnancy and an indicator for being a mother to Equation 2.

9 Conclusion

This paper studies the spillover effects of parenthood from workers to consumers in the medical setting. Using administrative insurance claims data from California and a triple-difference research design, we find that a female PCP's childbirth has significant negative effects on child patients. In particular, we find declines in children's claims to their attributed PCP; fewer overall office visits; and reductions in vaccinations during the two years after a PCP's childbirth. These effects persist even when the birthing PCP has returned to work, suggesting that there may be a "scarring" effect of the initial physician interruption. In contrast, we find muted effects on adult patients' care utilization, suggesting that children may be more vulnerable to changes in PCP access. One potential explanation for these divergent patterns is that a greater share of children's health care consumption may be for preventive care, where behavioral hazard may reduce demand for care Baicker, Mullainathan and Schwartzstein (2015); consistent with this explanation, the children in our sample are healthier, use fewer prescription medications, and have more preventive care use. The negative effects on children may be further amplified by the context; pediatric care shortages within the Medi-Cal program may make it difficult for patients to identify substitute providers (Gold, 2024) .

Overall, our results suggest that parenthood not only generates asymmetric career costs across female and male workers, but also for their *clients*. Thus, policies that could facilitate parents' return to work or target vulnerable consumers during these transitions may improve consumer wellbeing. We study these costs in the context of primary care, but we speculate that our results may apply to other professions where relational capital between workers and consumers are an important input into production. This characterizes many care occupations, including health care, social work, and teaching, where women comprise a large share of the labor force. We leave these extensions to future work.

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10 Figures and Tables

Table 1: Descriptive Statistics of Patient Sample

	All	Kids	Adults
Share white	0.156	0.111	0.209
	(0.363)	(0.314)	(0.406)
Share Black	0.084	0.065	0.105
	(0.277)	(0.246)	(0.307)
Share Hispanic	0.528	0.643	0.394
	(0.499)	(0.479)	(0.489)
Share female	0.562	0.493	0.642
	(0.496)	(0.500)	(0.479)
Year of birth	1,989.871	2,007.168	1,969.801
	(22.39)	(5.461)	(17.26)
Age	24.711	7.318	44.892
	(22.43)	(5.242)	(17.22)
HCC risk score (normalized)	1.000	0.373	1.728
	(2.933)	(1.966)	(3.621)
Share with Pediatrician as PCP	0.407	0.755	0.002
	(0.491)	(0.430)	(0.0463)
PCP E&M claims (quarterly)	0.487	0.431	0.552
	(0.602)	(0.490)	(0.704)
E&M claims (quarterly)	1.684	1.412	1.999
	(1.881)	(1.522)	(2.185)
Prescription claims (quarterly)	2.620	1.052	4.440
	(5.538)	(2.178)	(7.388)
Emergency claims (quarterly)	0.340	0.241	0.454
	(0.954)	(0.492)	(1.288)
Vaccination claims (quarterly)	0.244	0.372	0.095
	(0.772)	(1.005)	(0.269)
Physician familiarity (weeks)	17.025	18.280	15.570
	(27.81)	(29.27)	(25.94)
Share of quarters enrolled in Medi-Cal	0.812	0.816	0.807
	(0.267)	(0.269)	(0.266)
Patients	384,770	206,660	178,110

Notes: This table presents summary statistics based on insurance claims to the Medicaid program in California (2012–2019). Column 1 provides statistics for all patients in our analysis sample. Columns 2–3 provide statistics for our samples of child patients (under age 18) and adult patients (over age 18), respectively. These statistics are calculated in the year prior to the childbirth "event" in the analysis.

Table 2: Impact of Childbirth on Gender Gap in Physician Claims

	All Patients		Child Patients		Adult Patients	
	(1) Total office claims	(2) Any office claims	(3) Total office claims	(4) Any office claims	(5) Total office claims	(6) Any office claims
Quarter of Child Birth x Mom	-133.179***	-0.318***	-176.909***	-0.405***	-94.501***	-0.288***
	(21.399)	(0.031)	(47.869)	(0.049)	(19.568)	(0.037)
1-7 Quarters Post-Birth x Mom	-48.290*	-0.017	-71.966	-0.058	-30.796	-0.001
	(25.603)	(0.025)	(53.779)	(0.044)	(24.867)	(0.029)
Outcome Mean Pre-Birth	148.228	0.759	240.921	0.802	111.437	0.742
Observations	44,868	42,338	20,189	19,225	36,526	34,476
Doctors	2,976	2,976	1,370	1,370	2,405	2,405

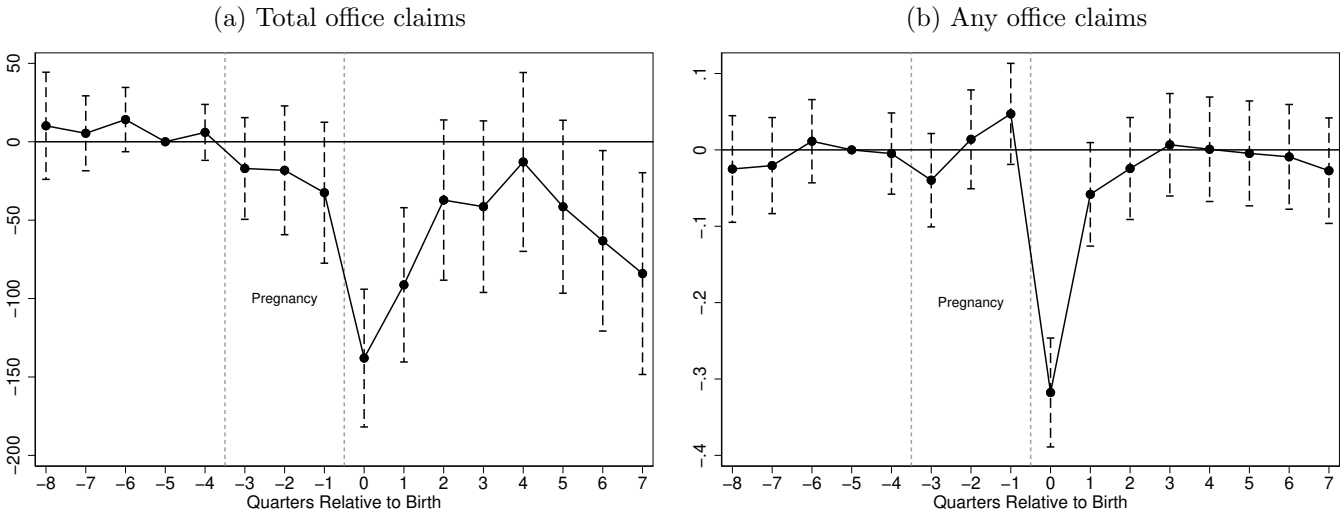
Notes: This table shows estimates of the impact of becoming a mother from a triple-difference model (Equation 2). We show results for total office claims (in the odd columns), and on having any office claims (in the even columns). We perform estimation separately for three samples: (i) the full sample of matched doctors, with no weights (columns 1-2); (ii) doctors that have child patients (columns 3-4), weighted by the share of each doctor's patients who are children; and doctors with adult patients, weighted by the share of each doctor's patients who are adults (columns 5-6). Standard errors, shown in parentheses, are clustered at the matched parent/non-parent pair level.

Table 3: Children's Care Utilization Declines After a Physician's Childbirth

	Office visits			Vaccinations		Other medical care		Enrollment
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Attributed PCP claims	Total claims	Familiarity with doctor (weeks)	All vaccination claims	Non-seasonal vaccination claims	Pharmacy claims	Emergency care claims	Enrolled this quarter
A. Children								
Quarter of Child Birth x Mom	-0.397***	-0.206**	-9.565***	-0.252***	-0.206**	-0.064	-0.008	-0.014
	(0.064)	(0.080)	(2.411)	(0.094)	(0.081)	(0.057)	(0.016)	(0.015)
1-7 Quarters Post-Birth x Mom	-0.109**	-0.098	-6.647*	-0.216**	-0.185**	0.017	-0.018	-0.007
	(0.045)	(0.061)	(3.983)	(0.096)	(0.081)	(0.046)	(0.013)	(0.015)
Outcome Mean Pre-Birth	0.471	1.503	25.369	0.396	0.321	1.119	0.254	0.818
Observations	3,021,981	3,021,981	1,429,900	3,021,981	3,021,981	3,021,981	3,021,981	3,021,981
Doctors	1,370	1,370	1,370	1,370	1,370	1,370	1,370	1,370
B. Adults								
Quarter of Child Birth x Mom	-0.331***	0.001	-4.014**	0.024	0.022	-0.147	0.014	0.001
	(0.099)	(0.128)	(1.852)	(0.033)	(0.029)	(0.200)	(0.038)	(0.014)
1-7 Quarters Post-Birth x Mom	0.033	0.075	1.171	0.002	-0.000	-0.023	0.026	0.002
	(0.066)	(0.081)	(2.462)	(0.014)	(0.010)	(0.188)	(0.025)	(0.014)
Outcome Mean Pre-Birth	0.600	2.099	23.620	0.104	0.062	4.696	0.486	0.818
Observations	2,768,333	2,768,333	1,450,985	2,768,333	2,768,333	2,768,333	2,768,333	2,768,333
Doctors	2,405	2,405	2,405	2,405	2,405	2,405	2,405	2,405

Notes: This table presents estimates of the impact of having a physician who becomes a mother from a triple-difference model (Equation 2). Panels A and B present coefficients when we analyze outcomes of child and adult patients, respectively. Each column presents effects on a different patient outcome, including: office claims to one's attributed PCP (column 1); total office claims (column 2); familiarity with one's provider at an appointment (column 3); the number of vaccination claims (column 4); the number of routine, non-seasonal vaccination claims (column 5); the number of pharmacy claims (column 6); the number of emergency claims (column 7); and the likelihood of being enrolled in Medi-Cal (column 8). Standard errors, shown in parentheses, are clustered at the attributed physician level.

Figure 1: Impact of Childbirth on Gender Gap in Physician Claims

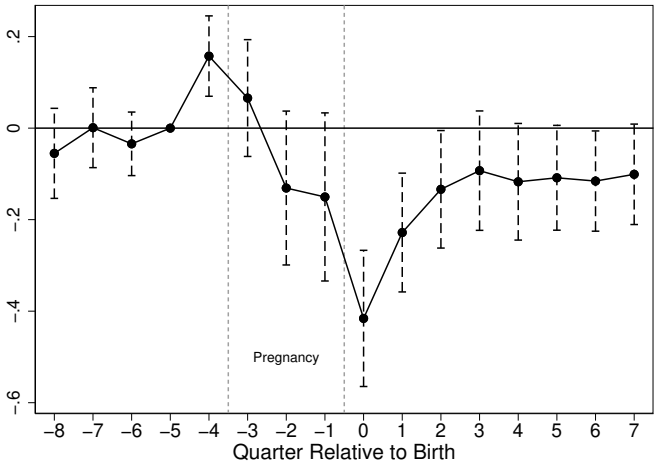


Notes: This figure reports the coefficents $\hat{\gamma_j}$ from Equation 1 in an analysis of physicians' work volume. The event studies in Panels A and B show impacts of becoming a mother on total office claims and on having any office claims, respectively, in each quarter relative to birth. The coefficient 5 quarters prior to the physician becoming a mother is normalized to zero. The dashed vertical lines around each dot are estimates of the 90 percent confidence interval. Standard errors are clustered at the attributed physician level.

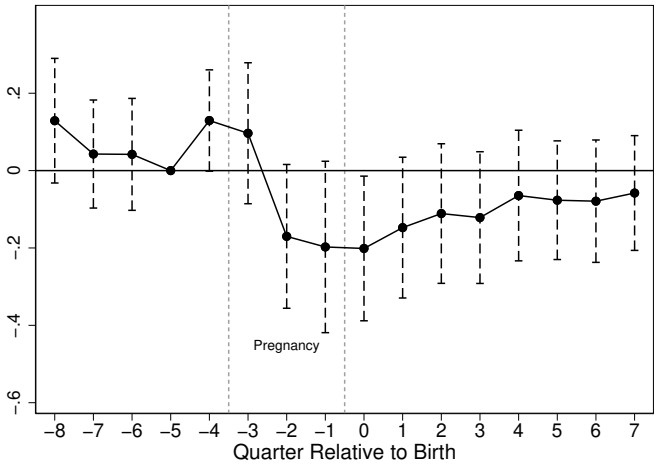
Figure 2: Children's Health Care Utilization Around a Physician's Childbirth

(a) Office claims

(i) PCP visits

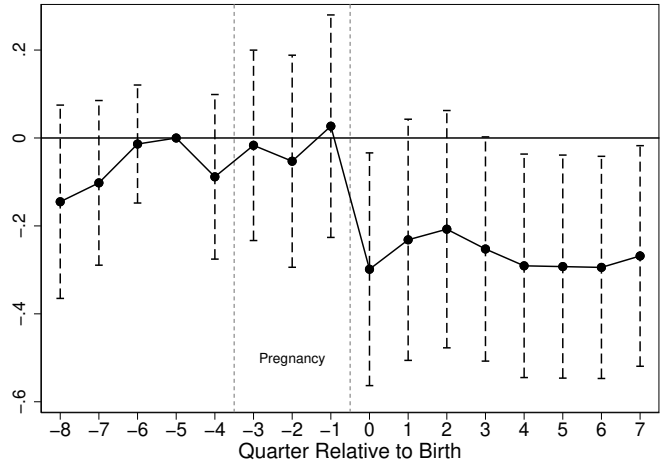


(ii) All visits

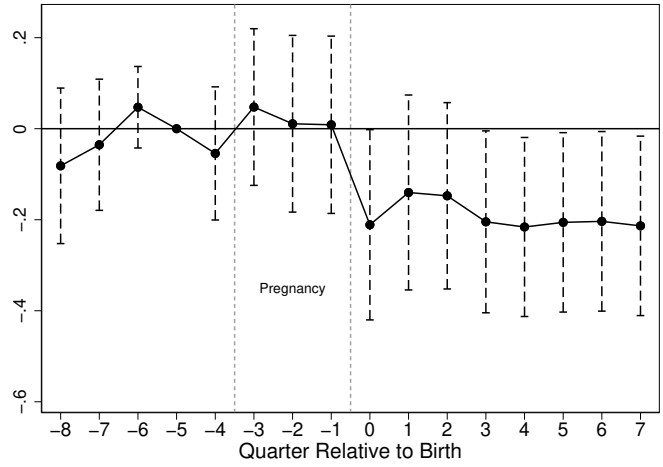


(b) Vaccination claims

(i) All vaccines



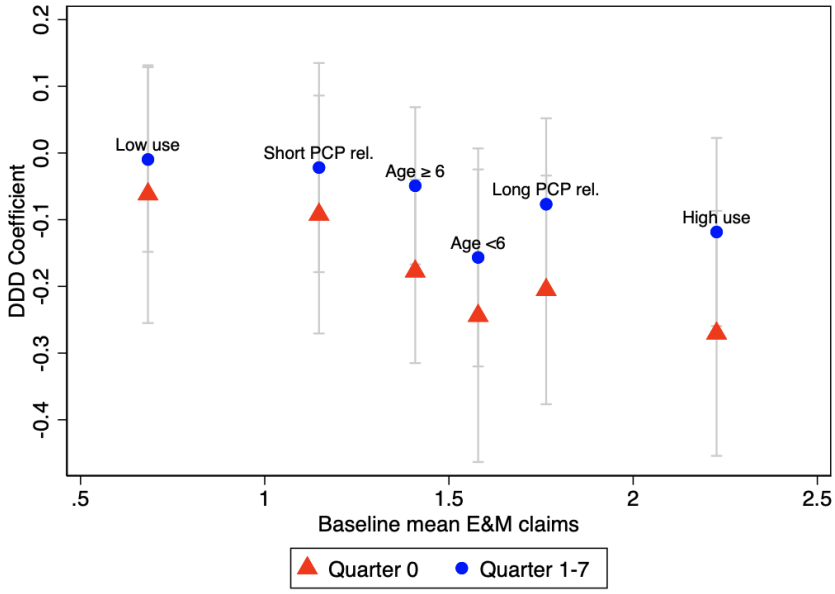
(ii) Regular (non-seasonal) vaccines



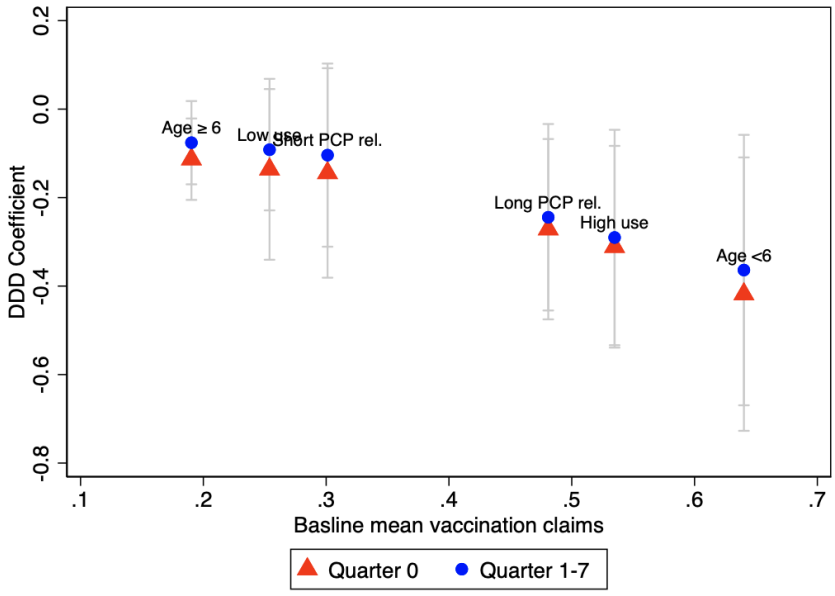
Notes: This figure reports the coefficents $\hat{\gamma}_j$ from Equation 1 in an analysis of child patients. Each panel of the figure shows the effects for a different dependent variable: the number of office claims with one's usual PCP (panel a, subfigure i); total office claims (panel a, subfigure ii); the total number of vaccination claims (panel b, subfigure i); and the total number of regular (non-seasonal) vaccination claims (panel b, subfigure ii). The coefficient 5 quarters prior to the patient's physician becoming a mother is normalized to zero. The dashed vertical lines around each dot are estimates of the 90 percent confidence interval. Standard errors are clustered at the attributed physician level.

Figure 3: Heterogeneity in Children's Health Care Utilization Around a Physician's Childbirth

(a) Total office claims



(b) Vaccination claims



Notes: These graph plot estimates of our triple-differences specification (Equation 2), estimated on subsamples of child patients. We show effects for patients in the following six subsamples: above- vs. below-median patient office claims during the pre-pregnancy period (labeled as "High use" and "Low use" in the graph); above- vs. below-median familiarity with one's PCP at the time of the birth (labeled as "Long PCP rel." and "Short PCP rel." in the graph); and over or under 6 years old at the time of PCP birth (labeled as "Age $\geq$ 6" and "Age $<$ 6" in the graph). Panel A presents impacts on total office claims, and Panel B presents effects on vaccination claims. Each graph includes the coefficients and 95% confidence intervals for the quarter of the birth (quarter 0) and in quarters 1-7. The coefficients are ordered on the x-axis by the mean of the dependent variable for the subsample, calculated over the two years prior to the birth.

ONLINE APPENDIX:
Social Costs of Work Disruptions: Evidence from Physicians and their Patients

Leila Agha, Myles Wagner, Na'ama Shenhav

January 31, 2025

A1 Medi-Cal Data Construction

In this section, we discuss the process of identifying NPI's for parents in the Vital Statistics records, candidates for the matched comparison group, and linking these physicians to Medi-Cal records.

Identifying NPI's for Parents in the Birth Records We identify NPI's for physician parents in the birth records through a name-based link to two physician directories: the National Plan & Provider Enumeration System (NPPES, 2007-2022) and the Center for Medicare & Medicaid Services (CMS) Doctors and Clinicians National Downloadable File (2015-2022). We use fuzzy name matching, and prioritize matches of physicians who practice in California. We attempt to match mothers using both married and maiden names, when they differ. We drop any duplicate matches, which can arise if more than one doctor in California has the same first and last names.

Candidates for Matched Comparison: Non-Parent Physicians We generate a list of candidates for our matched comparison group based on two criteria: (i) being a physician in the NPPES who reports practicing in California during our sample period and (ii) not matching to our parent list. This excludes any physician whose name matches that of a physician parent, even if the name is ultimately discarded as a non-unique parent name. As we discuss in the paper, some of these physicians may indeed have children; which makes our estimates a lower bound on the impact of parenthood.

Linking to Medi-Cal Claims Having arrived at this list of parent and non-parent NPI's, we then limited this list to physicians who specialize in primary care, including family practice, pediatrics, internal medicine, and obstetrics/gynecology.[13] We sent this list to DHCS, who linked these physicians to the Medi-Cal claims database. We then received a data set containing all claims for patients who were ever treated by a listed physician at any point during our 8-year sample period.

A2 Matching Procedure

In this section, we describe the matching procedure used to construct control groups for both the physician and patient analysis.

Matching Physicians For each parent-birth, we consider non-parent physicians at the same calendar time who match exactly on gender, specialty, and medical school graduation cohort, and match coarsely on the number of patients attributed to both physicians ten months prior (before a pregnancy or placebo pregnancy). In particular, we match on the decile of the distribution

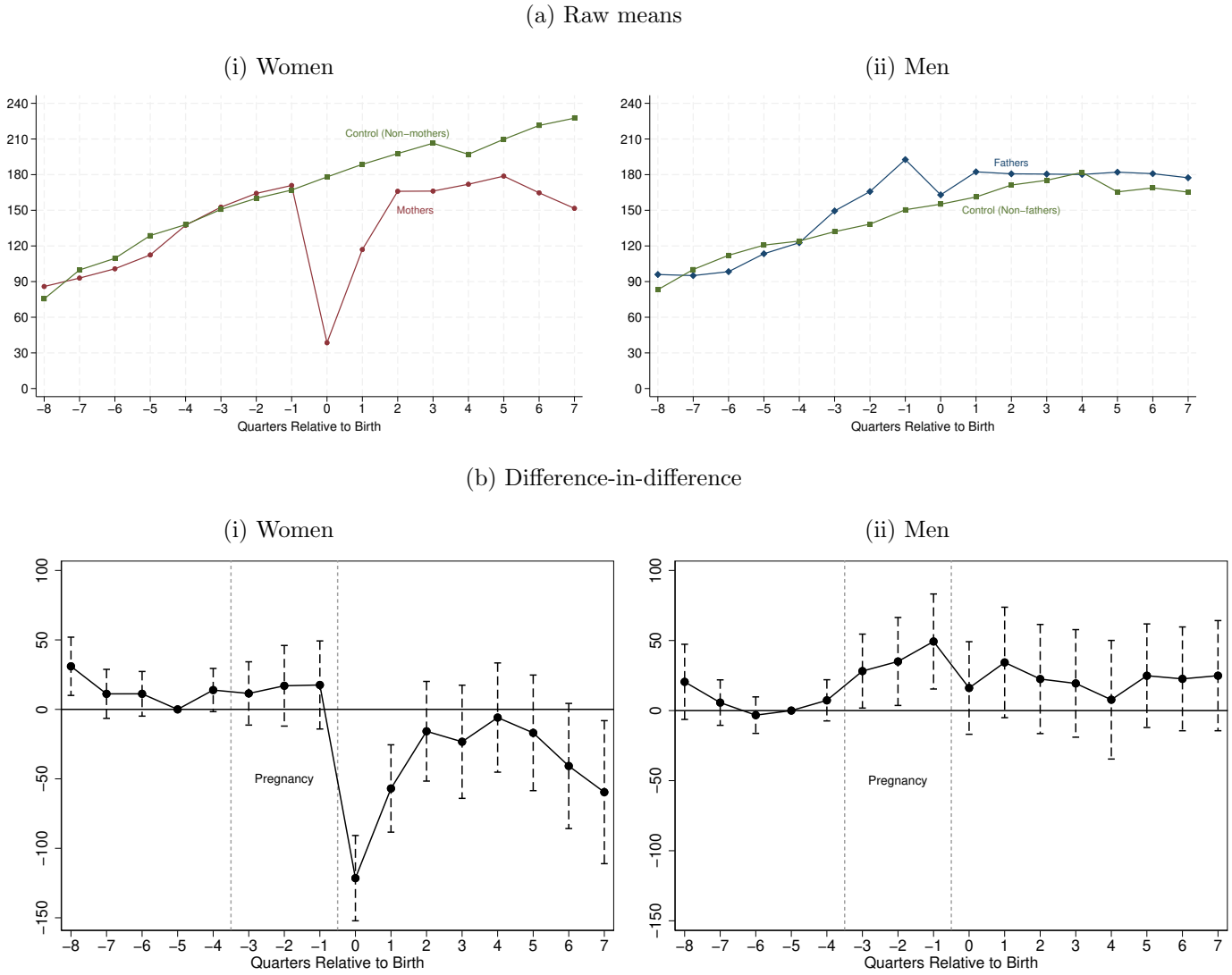
[13] We focus on these specialties because they are common among physicians of both genders, and because Medicaid patients make up a substantial proportion of the market for their services in California.

of attributed patient count, and an additional dummy for being in the top ventile of attributed patients to capture especially high-volume doctors. We match without replacement: allowing each parent and non-parent to be matched at most one time. A small number of parents remain unmatched after this procedure due to the graduation year matching requirement. For those parents, we perform a second round of matching where we relax this requirement and instead match coarsely on graduation year.

Constructing Patient Panel We construct panels of treated and un-treated patients corresponding to their attribution to a parent or matched non-parent in the above matched sample. For each panel of control patients (corresponding to a matched non-parent), we weight control patients by the ratio of the number of patients of the matched parent to the number of (treated) patients of the parent physician. Because of differences in timing across different parent/non-parent matched pairs, a small number of patients appear in multiple physician panels over time; when this is the case, we keep only the earliest chronological patient appearance.

A3 Appendix Tables and Figures

Figure A1: Total Office Claims Around Childbirth: Raw Means and Difference-in-Difference

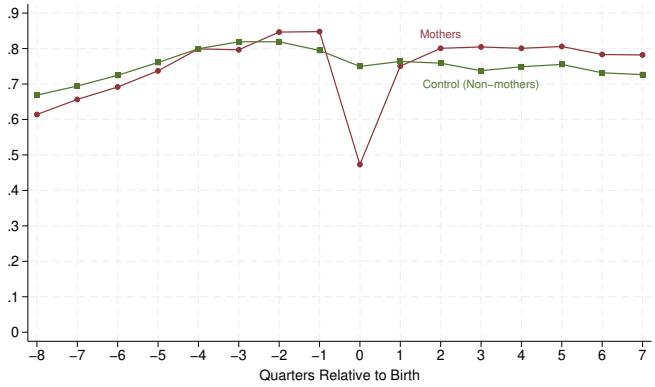


Notes: The figure shows raw means and difference-in-difference event study coefficients for total office claims per quarter. Panel (a) shows quarterly means for (i) women and (ii) men, where mothers' means are indicated with red circles, fathers' means are indicated with blue diamonds, and matched non-parent means are shown with green squares for both men and women. Panel (b) shows difference-in-difference event study coefficients the effect of parenthood for (i) mothers and (ii) fathers. The coefficient 5 quarters prior to the physician becoming a parent is normalized to zero. The dashed vertical lines around each dot are estimates of the 90 percent confidence interval. Standard errors are clustered at the attributed physician level.

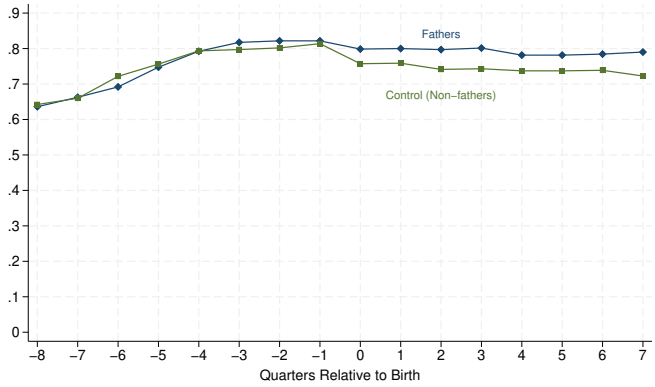
Figure A2: Any Office Claims Around Childbirth: Raw Means and Difference-in-Difference

(a) Raw means

(i) Women

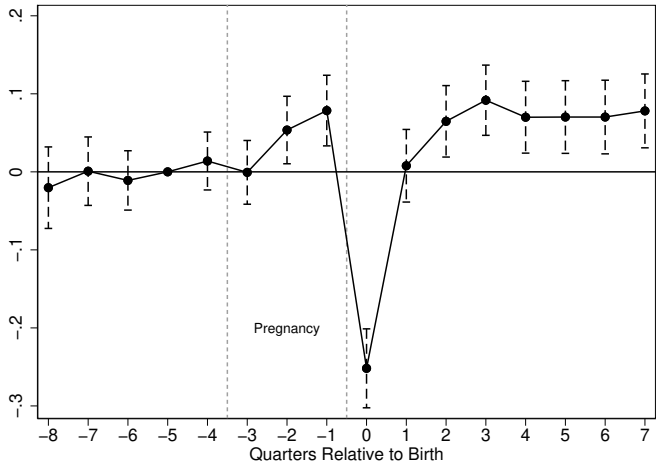


(ii) Men

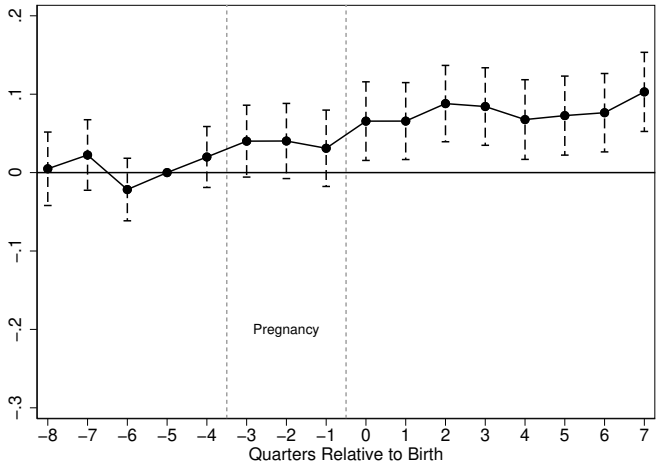


(b) Difference-in-difference

(i) Women



(ii) Men

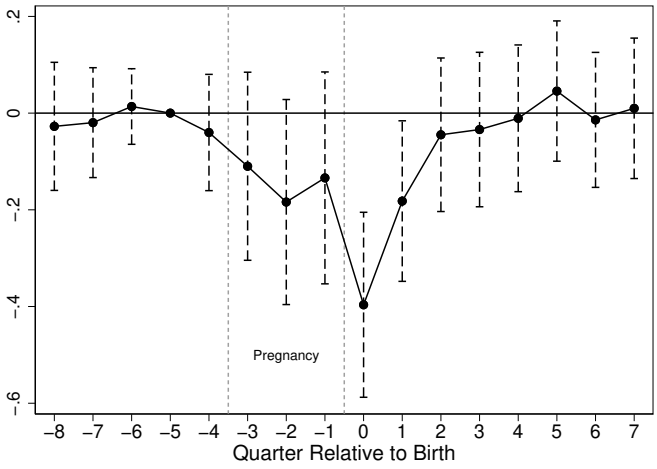


Notes: The figure shows raw means and difference-in-difference event study coefficients for whether the physician had any office claims per quarter. Panel (a) shows quarterly means for (i) women and (ii) men, where mothers' means are indicated with red circles, fathers' means are indicated with blue diamonds, and matched non-parent means are shown with green squares for both men and women. Panel (b) shows difference-in-difference event study coefficients the effect of parenthood for (i) mothers and (ii) fathers. The coefficient 5 quarters prior to the physician becoming a parent is normalized to zero. The dashed vertical lines around each dot are estimates of the 90 percent confidence interval. Standard errors are clustered at the attributed physician level.

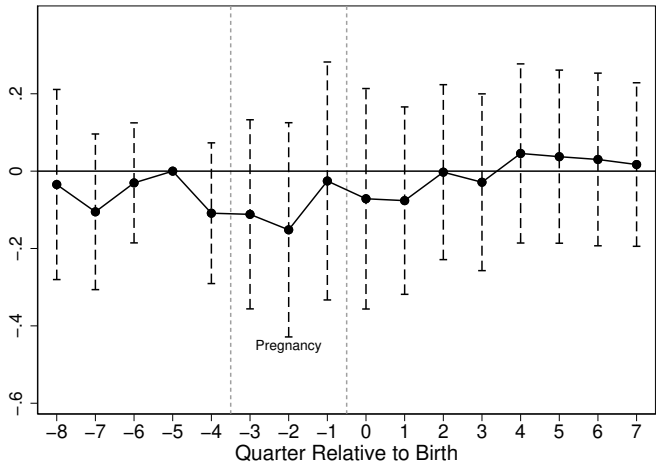
Figure A3: Adults Health Care Utilization Around a Physician's Childbirth

(a) Office visits

(i) PCP claims

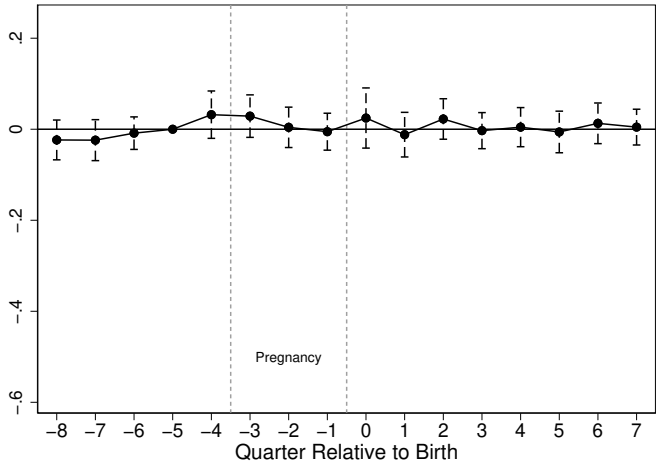


(ii) All claims

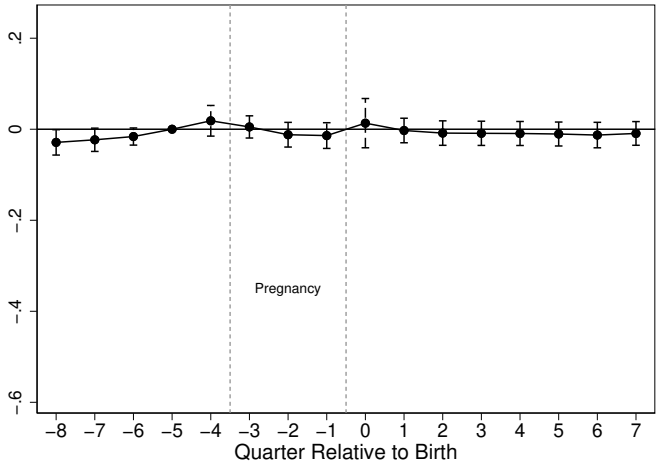


(b) Vaccinations

(i) All vaccines



(ii) Regular (non-seasonal) vaccines



Notes: This figure reports the coefficents $\hat{\gamma_j}$ from Equation 1 in an analysis of child patients. Each panel of the figure shows the effects for a different dependent variable: the number of office claims with one's usual PCP (panel a, subfigure i); total office claims (panel a, subfigure ii); the total number of vaccination claims (panel b, subfigure i); and the total number of regular (non-seasonal) vaccination claims (panel b, subfigure ii). The coefficient 5 quarters prior to the patient's physician becoming a mother is normalized to zero. The dashed vertical lines around each dot are estimates of the 90 percent confidence interval. Standard errors are clustered at the attributed physician level.

Table A1: Descriptive Statistics: Matched Physician Sample

	Women			Men		
	(1)	(2)	(3)	(4)	(5)	(6)
	Moms	Matched Women	All Sampled Docs w/o Childbirth	Dads	Matched Men	All Sampled Docs w/o Childbirth
Specialty: Primary Care	0.681	0.681	0.591	0.856	0.856	0.783
	(0.467)	(0.467)	(0.492)	(0.351)	(0.351)	(0.412)
Specialty: Pediatrician	0.319	0.319	0.252	0.144	0.144	0.150
	(0.467)	(0.467)	(0.434)	(0.351)	(0.351)	(0.357)
Specialty: Ob-Gyn	0.000	0.000	0.157	0.000	0.000	0.067
	(0)	(0)	(0.364)	(0)	(0)	(0.250)
Med. School Grad. Year	2,006.841	2,006.158	2,002.647	2,004.491	2,003.814	1,998.278
	(4.221)	(4.438)	(6.400)	(5.978)	(6.266)	(9.212)
Avg. E&M Claims (Qtrly)	113.029	105.781	68.319	87.485	84.725	66.177
	(296.1)	(252.0)	(278.9)	(252.7)	(221.2)	(285.7)
Share of Months w/ Medicaid Claims	0.673	0.676	0.606	0.715	0.709	0.647
	(0.305)	(0.309)	(0.345)	(0.311)	(0.314)	(0.350)
Start of Medicaid Claims History	2,012.403	2,012.518	2,012.971	2,012.213	2,012.340	2,012.769
	(1.512)	(1.568)	(2.239)	(1.490)	(1.625)	(2.238)
Physicians	739	739	9,083	764	764	11,827

Notes: This table presents summary statistics for our analysis sample of matched parent and non-parent physicians, in addition to the full sample of physicians without a childbirth. Columns 1-3 show summary statistics for female physicians, while columns 4-6 show summary statistics for male physicians. Specialty and graduation year are fixed physician characteristics. The measures of claims volume shown are calculated over the first 24 months of each physician's Medicaid claims panel, starting from their first observed claim.

Table A2: Impacts of Childbirth on Women's Work Volume (Difference-in-Differences)

	All Patients		Child Patients		Adult Patients	
	(1) Total office claims	(2) Any office claims	(3) Total office claims	(4) Any office claims	(5) Total office claims	(6) Any office claims
Quarter of Child Birth	-135.475***	-0.272***	-214.793***	-0.295***	-89.657***	-0.256***
	(14.484)	(0.023)	(22.758)	(0.037)	(14.697)	(0.028)
1-7 Quarters Post-Birth	-45.304**	0.045***	-78.561***	0.026	-26.235	0.055***
	(18.593)	(0.017)	(26.329)	(0.026)	(20.406)	(0.021)
Outcome Mean Pre-Birth	150.353	0.755	206.432	0.785	117.879	0.738
Observations	24,022	22,549	13,078	12,400	17,784	16,692
Doctors	1,600	1,600	889	889	1,169	1,169

Notes: This table shows estimates of the impact of becoming a mother from a difference-in-differences model restricted to female physicians. We show results for total office claims (in the odd columns), and on having any office claims (in the even columns). We perform estimation separately for three samples: (i) the full sample of matched doctors, with no weights (columns 1-2); (ii) doctors that have child patients (columns 3-4), weighted by the share of each doctor's patients who are children; and doctors with adult patients, weighted by the share of each doctor's patients who are adults (columns 5-6). Standard errors, shown in parentheses, are clustered at the matched parent/non-parent pair level.

Table A3: Impacts of Childbirth on Fathers' Work Volume (Difference-in-Differences)

	All Patients		Child Patients		Adult Patients	
	(1) Total office claims	(2) Any office claims	(3) Total office claims	(4) Any office claims	(5) Total office claims	(6) Any office claims
Quarter of Child Birth	-2.339	0.046**	-34.897	0.103***	4.539	0.032
	(15.731)	(0.021)	(39.950)	(0.032)	(13.485)	(0.024)
1-7 Quarters Post-Birth	3.904	0.060***	-0.461	0.075**	5.552	0.055***
	(17.406)	(0.018)	(45.250)	(0.034)	(14.782)	(0.020)
Outcome Mean Pre-Birth	145.780	0.763	318.042	0.840	105.640	0.745
Observations	20,846	19,789	7,111	6,825	18,742	17,784
Doctors	1,376	1,376	481	481	1,236	1,236

Notes: This table shows estimates of the impact of becoming a father from a difference-in-differences model restricted to male physicians. We show results for total office claims (in the odd columns), and on having any office claims (in the even columns). We perform estimation separately for three samples: (i) the full sample of matched doctors, with no weights (columns 1-2); (ii) doctors that have child patients (columns 3-4), weighted by the share of each doctor's patients who are children; and doctors with adult patients, weighted by the share of each doctor's patients who are adults (columns 5-6). Standard errors, shown in parentheses, are clustered at the matched parent/non-parent pair level.

Table A4: Descriptive Statistics on Child Patient Sample, by PCP Parent Status

	Women:			Men:		
	All	Parent	Placebo	All	Parent	Placebo
Share white	0.110	0.107	0.113	0.112	0.113	0.112
	(0.313)	(0.309)	(0.317)	(0.316)	(0.316)	(0.315)
Share Black	0.069	0.072	0.065	0.060	0.068	0.051
	(0.253)	(0.259)	(0.247)	(0.237)	(0.251)	(0.220)
Share Hispanic	0.640	0.642	0.638	0.647	0.627	0.668
	(0.480)	(0.479)	(0.481)	(0.478)	(0.484)	(0.471)
Share female	0.512	0.516	0.508	0.467	0.465	0.469
	(0.500)	(0.500)	(0.500)	(0.499)	(0.499)	(0.499)
Year of birth	2,007.002	2,007.092	2,006.910	2,007.398	2,007.624	2,007.165
	(5.411)	(5.399)	(5.421)	(5.521)	(5.510)	(5.522)
Age	7.304	7.252	7.358	7.338	7.320	7.355
	(5.231)	(5.248)	(5.213)	(5.256)	(5.265)	(5.247)
HCC risk score (normalized)	0.353	0.356	0.350	0.400	0.445	0.355
	(1.933)	(2.079)	(1.769)	(2.009)	(2.255)	(1.720)
Share with Pediatrician as PCP	0.804	0.817	0.790	0.688	0.706	0.669
	(0.397)	(0.386)	(0.408)	(0.463)	(0.456)	(0.470)
PCP E&M claims (quarterly)	0.426	0.448	0.404	0.437	0.460	0.413
	(0.478)	(0.466)	(0.489)	(0.506)	(0.539)	(0.468)
E&M claims (quarterly)	1.489	1.473	1.505	1.306	1.280	1.332
	(1.605)	(1.551)	(1.659)	(1.392)	(1.344)	(1.438)
Prescription claims (quarterly)	1.049	1.045	1.052	1.056	1.102	1.009
	(2.237)	(2.454)	(1.987)	(2.095)	(2.309)	(1.848)
Emergency claims (quarterly)	0.241	0.246	0.236	0.241	0.234	0.248
	(0.505)	(0.509)	(0.501)	(0.474)	(0.466)	(0.482)
Vaccination claims (quarterly)	0.393	0.419	0.365	0.343	0.281	0.406
	(0.996)	(1.123)	(0.843)	(1.017)	(0.710)	(1.254)
Physician familiarity (weeks)	16.253	15.839	16.694	21.079	25.467	16.473
	(26.56)	(25.48)	(27.65)	(32.43)	(37.25)	(25.64)
Share of quarters enrolled in Medi-Cal	0.816	0.826	0.805	0.817	0.821	0.812
	(0.270)	(0.257)	(0.283)	(0.267)	(0.259)	(0.274)
Patients	119,917	61,057	58,860	86,743	43,942	42,801

Notes: This table presents summary statistics of our analysis sample of child patients. Each column shows statistics for a different subsample: we show statistics for all patients of women physicians in column 1; for patients of physicians become mothers in column 2; for patients of women physicians in the matched non-parent sample in column 3; for all patients of men physicians in column 4; for patients of physicians become fathers in column 5; for patients of men physicians in the matched non-parent sample in column 6.

Table A5: Descriptive Statistics on Adult Patient Sample, by PCP Parent Status

	Women:			Men:		
	All	Parent	Placebo	All	Parent	Placebo
Share white	0.192	0.194	0.190	0.224	0.210	0.240
	(0.394)	(0.396)	(0.392)	(0.417)	(0.407)	(0.427)
Share Black	0.102	0.103	0.102	0.108	0.116	0.099
	(0.303)	(0.303)	(0.302)	(0.310)	(0.320)	(0.299)
Share Hispanic	0.407	0.386	0.431	0.382	0.379	0.385
	(0.491)	(0.487)	(0.495)	(0.486)	(0.485)	(0.487)
Share female	0.690	0.686	0.695	0.598	0.603	0.592
	(0.462)	(0.464)	(0.460)	(0.490)	(0.489)	(0.492)
Year of birth	1,971.517	1,971.401	1,971.653	1,968.201	1,968.730	1,967.572
	(16.77)	(16.80)	(16.74)	(17.56)	(17.44)	(17.67)
Age	43.344	43.514	43.145	46.335	45.849	46.913
	(16.74)	(16.76)	(16.72)	(17.53)	(17.39)	(17.68)
HCC risk score (normalized)	1.550	1.559	1.539	1.894	1.894	1.895
	(3.331)	(3.386)	(3.266)	(3.864)	(3.929)	(3.785)
Share with Pediatrician as PCP	0.003	0.005	0.000	0.002	0.003	0.000
	(0.0526)	(0.0715)	(0)	(0.0395)	(0.0535)	(0)
PCP E&M claims (quarterly)	0.529	0.529	0.530	0.573	0.593	0.550
	(0.671)	(0.621)	(0.724)	(0.733)	(0.722)	(0.745)
E&M claims (quarterly)	2.076	2.047	2.110	1.926	1.932	1.920
	(2.294)	(2.136)	(2.466)	(2.075)	(2.067)	(2.083)
Prescription claims (quarterly)	4.211	4.125	4.310	4.654	4.512	4.822
	(7.100)	(6.853)	(7.376)	(7.640)	(7.398)	(7.915)
Emergency claims (quarterly)	0.444	0.436	0.453	0.463	0.465	0.461
	(1.233)	(1.270)	(1.188)	(1.337)	(1.239)	(1.446)
Vaccination claims (quarterly)	0.104	0.104	0.104	0.086	0.088	0.084
	(0.275)	(0.288)	(0.260)	(0.263)	(0.270)	(0.255)
Physician familiarity (weeks)	14.765	15.314	14.110	16.322	15.815	16.939
	(24.97)	(25.85)	(23.86)	(26.79)	(25.48)	(28.29)
Share of quarters enrolled in Medi-Cal	0.803	0.814	0.790	0.810	0.804	0.817
	(0.266)	(0.256)	(0.277)	(0.265)	(0.263)	(0.268)
Patients	85,920	46,254	39,666	92,190	50,096	42,094

Notes: This table presents summary statistics of our analysis sample of adult patients. Each column shows statistics for a different subsample: we show statistics for all patients of women physicians in column 1; for patients of physicians become mothers in column 2; for patients of women physicians in the matched non-parent sample in column 3; for all patients of men physicians in column 4; for patients of physicians become fathers in column 5; for patients of men physicians in the matched non-parent sample in column 6.

Table A6: Evidence from License Surveys: Short- and Medium-Run Effects on Physician Work

	All Patients		Child Patients		Adult Patients	
	(1) Patient Hours (Imputed)	(2) Any Survey	(3) Patient Hours (Imputed)	(4) Any Survey	(5) Patient Hours (Imputed)	(6) Any Survey
Year of Child Birth x Mom	-1.279	0.027	-4.936***	0.073	0.022	0.032
	(0.947)	(0.049)	(1.839)	(0.089)	(1.100)	(0.057)
1 Year Post-Birth x Mom	0.837	0.013	1.369	-0.023	0.397	0.014
	(0.898)	(0.044)	(1.725)	(0.082)	(1.092)	(0.051)
Outcome Mean Pre-Birth	35.022	0.544	34.355	0.544	35.294	0.544
Observations	4,292	8,174	1,870	3,615	3,468	6,594
Doctors	2,064	2,064	915	915	1,665	1,665

Notes: This table shows estimates of the impact of becoming a mother from a triple-difference model (Equation 2). We show results for imputed weekly patient hours (in the odd columns), and on participating in the hours survey (in the even columns). We perform estimation separately for three samples: (i) the full sample of matched doctors, with no weights (columns 1-2); (ii) doctors that have child patients (columns 3-4), weighted by the share of each doctor's patients who are children; and doctors with adult patients, weighted by the share of each doctor's patients who are adults (columns 5-6). Standard errors, shown in parentheses, are clustered at the matched parent/non-parent pair level.

Table A7: Evidence from License Surveys: Short- and Medium-Run Effects on Physician Work

	All Patients					Child Patients					Adult Patients				
	(1) Patient Hours (≥ 40)	(2) Patient Hours (≥ 35)	(3) Patient Hours (≥ 25)	(4) Patient Hours (≥ 15)	(5) Patient Hours (≥ 5)	(6) Patient Hours (≥ 40)	(7) Patient Hours (≥ 35)	(8) Patient Hours (≥ 25)	(9) Patient Hours (≥ 15)	(10) Patient Hours (≥ 5)	(11) Patient Hours (≥ 40)	(12) Patient Hours (≥ 35)	(13) Patient Hours (≥ 25)	(14) Patient Hours (≥ 15)	(15) Patient Hours (≥ 5)
Year of Child Birth x Mom	-0.021	-0.052	-0.038	-0.017	-0.021*	-0.242**	-0.174*	-0.075	-0.106***	-0.033	0.040	-0.005	-0.027	0.022	-0.014
	(0.060)	(0.046)	(0.030)	(0.022)	(0.012)	(0.110)	(0.089)	(0.057)	(0.041)	(0.021)	(0.071)	(0.055)	(0.034)	(0.026)	(0.013)
1 Year Post-Birth x Mom	-0.013	0.064	0.025	0.003	-0.002	-0.046	0.103	0.072	-0.004	-0.022	-0.020	0.034	0.012	0.003	-0.000
	(0.052)	(0.047)	(0.031)	(0.020)	(0.011)	(0.093)	(0.091)	(0.060)	(0.032)	(0.020)	(0.062)	(0.055)	(0.038)	(0.025)	(0.013)
Outcome Mean Pre-Birth	0.573	0.818	0.928	0.972	0.996	0.494	0.782	0.934	0.976	0.993	0.605	0.833	0.925	0.971	0.996
Observations	4,292	4,292	4,292	4,292	4,292	1,870	1,870	1,870	1,870	1,870	3,468	3,468	3,468	3,468	3,468
Doctors	2,064	2,064	2,064	2,064	2,064	915	915	915	915	915	1,665	1,665	1,665	1,665	1,665

Notes: This table shows estimates of the impact of becoming a mother from a triple-difference model (Equation 2). We show results for survey response, where doctors indicate into which of several bins their weekly working hours fall. We perform estimation separately for three samples: (i) the full sample of matched doctors, with no weights (columns 1-5); (ii) doctors that have child patients (columns 6-10), weighted by the share of each doctor's patients who are children; and doctors with adult patients, weighted by the share of each doctor's patients who are adults (columns 11-15). Standard errors, shown in parentheses, are clustered at the matched parent/non-parent pair level.

Table A8: Impacts of a PCP's Childbirth on Child Patients' Detailed Preventative Care

	(1) Vaccination claims	(2) Non-seasonal vaccines	(3) Flu vaccine	(4) Any vaccine	(5) Lead tests
Quarter of Child Birth x Mom	-0.252***	-0.206**	-0.046**	-0.021	-0.005
	(0.094)	(0.081)	(0.021)	(0.013)	(0.005)
1-7 Quarters Post-Birth x Mom	-0.216**	-0.185**	-0.031*	-0.023**	-0.012**
	(0.096)	(0.081)	(0.016)	(0.011)	(0.005)
Outcome Mean Pre-Birth	0.396	0.321	0.075	0.114	0.032
Observations	3,021,981	3,021,981	3,021,981	3,021,981	3,021,981
Doctors	1,370	1,370	1,370	1,370	1,370

Notes: This table presents estimates of the impact of having a physician who becomes a mother from a triple-difference model (Equation 2) for an analysis of child patients. Each column presents effects on a different patient outcome, including: total vaccination claims (column 1); non-seasonal vaccination claims (column 2); flu vaccination claims (column 3); any vaccination claims (column 4); and lead screening test claims (column 5). Standard errors are clustered at the attributed physician level.

Table A9: Impacts on Children, Separately by Female and Male Physicians (Difference-in-differences)

	Female Physicians			Male Physicians		
	(1) Attributed PCP office claims	(2) Total office claims	(3) Vaccination claims	(4) Attributed PCP office claims	(5) Total office claims	(6) Vaccination claims
Quarter of Child Birth	-0.504***	-0.328***	-0.125**	-0.108**	-0.116**	0.113*
	(0.056)	(0.070)	(0.057)	(0.045)	(0.056)	(0.064)
1-7 Quarters Post-Birth	-0.083***	-0.111***	-0.096**	0.024	-0.017	0.098
	(0.025)	(0.041)	(0.046)	(0.037)	(0.043)	(0.064)
Outcome Mean Pre-Birth	0.469	1.596	0.418	0.473	1.376	0.367
Observations	1,776,362	1,776,362	1,776,362	1,245,619	1,245,619	1,245,619
Doctors	858	858	858	512	512	512

Notes: This table presents difference-in-difference impacts of having a physician who becomes a parent. Specifically, we estimate:

$$y_{igpt} = \alpha_i + \beta_1 \text{Parent}_i \times \text{Quarter } 0 + \beta_2 \text{Parent}_i \times \text{Quarters 1-7} + Z_{pgt}\lambda + \epsilon_{igpt}.$$

where Z_{pgt} includes interactions between indicators for event time and the year and quarter of childbirth. We present effects for patients of female physicians in columns 1–3, and for patients of male physicians in columns 4–6. Standard errors are clustered at the attributed physician level.

Table A10: Impacts on Children, Using Quarters Before Pregnancy as Pre-Period

	Office visits			Vaccinations		Other medical care		Enrollment
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Attributed PCP claims	Total claims	Familiarity with doctor (weeks)	All vaccination claims	Non-seasonal vaccination claims	Pharmacy claims	Emergency care claims	Enrolled this quarter
A. Children								
Quarter of Child Birth x Mom	-0.433***	-0.270**	-9.242***	-0.230**	-0.187**	-0.129*	-0.010	-0.024
	(0.082)	(0.105)	(3.448)	(0.113)	(0.095)	(0.072)	(0.020)	(0.021)
1-7 Quarters Post-Birth x Mom	-0.145**	-0.162**	-6.324	-0.194**	-0.166**	-0.048	-0.020	-0.017
	(0.058)	(0.075)	(4.817)	(0.091)	(0.076)	(0.059)	(0.016)	(0.021)
Outcome Mean Pre-Birth	0.471	1.503	25.369	0.396	0.321	1.119	0.254	0.818
Observations	3,021,981	3,021,981	1,429,900	3,021,981	3,021,981	3,021,981	3,021,981	3,021,981
Doctors	1,370	1,370	1,370	1,370	1,370	1,370	1,370	1,370
B. Adults								
Quarter of Child Birth x Mom	-0.382***	-0.015	-3.978*	0.029	0.023	-0.255	0.013	-0.001
	(0.110)	(0.162)	(2.277)	(0.034)	(0.030)	(0.258)	(0.046)	(0.021)
1-7 Quarters Post-Birth x Mom	-0.018	0.059	1.213	0.008	0.001	-0.131	0.025	0.000
	(0.077)	(0.106)	(2.838)	(0.019)	(0.014)	(0.232)	(0.030)	(0.021)
Outcome Mean Pre-Birth	0.600	2.099	23.620	0.104	0.062	4.696	0.486	0.818
Observations	2,768,333	2,768,333	1,450,985	2,768,333	2,768,333	2,768,333	2,768,333	2,768,333
Doctors	2,405	2,405	2,405	2,405	2,405	2,405	2,405	2,405

Notes: This table presents estimates of the impact of having a physician who becomes a mother from a modified version of our triple-difference model (Equation 2) for an analysis of child patients. Relative to the baseline model, we also include interactions between fixed effects for each trimester of pregnancy and an indicator for being a mother. Including these additional controls changes the reference period for our triple-difference model to be the period prior to *pregnancy*, rather than the period prior to having a child (inclusive of pregnancy). Each column presents effects on a different patient outcome, including: office claims to one's attributed PCP (column 1); total office claims (column 2); familiarity with one's provider at an appointment (column 3); the number of vaccination claims (column 4); the number of routine, non-seasonal vaccination claims (column 5); the number of pharmacy claims (column 6); the number of emergency claims (column 7); and the likelihood of being enrolled in Medi-Cal (column 8). Standard errors are clustered at the attributed physician level. Standard errors are clustered at the attributed physician level.

Table A11: Impacts on Children, Removing Controls for Doctor Relationship and Calendar Time

	PCP Office Claims		Total Office Claims		Vaccinations	
	(1)	(2)	(3)	(4)	(5)	(6)
	Base	No controls	Base	No controls	Base	No controls
A. Children						
Quarter of Child Birth x Mom	-0.397***	-0.406***	-0.206**	-0.203**	-0.252***	-0.197**
	(0.064)	(0.082)	(0.080)	(0.102)	(0.094)	(0.094)
1-7 Quarters Post-Birth x Mom	-0.109**	-0.095*	-0.098	-0.097	-0.216**	-0.201**
	(0.045)	(0.051)	(0.061)	(0.072)	(0.096)	(0.095)
Outcome Mean Pre-Birth	0.471	0.471	1.503	1.503	0.396	0.396
Observations	3,021,981	3,021,981	3,021,981	3,021,981	3,021,981	3,021,981
Doctors	1,370	1,370	1,370	1,370	1,370	1,370
B. Adults						
Quarter of Child Birth x Mom	-0.331***	-0.351***	0.001	-0.101	0.024	0.013
	(0.099)	(0.134)	(0.128)	(0.188)	(0.033)	(0.043)
1-7 Quarters Post-Birth x Mom	0.033	0.008	0.075	0.052	0.002	-0.000
	(0.066)	(0.080)	(0.081)	(0.097)	(0.014)	(0.016)
Outcome Mean Pre-Birth	0.600	0.600	2.099	2.099	0.104	0.104
Observations	2,768,333	2,768,333	2,768,333	2,768,333	2,768,333	2,768,333
Doctors	2,405	2,405	2,405	2,405	2,405	2,405

Notes: This table presents estimates of the impact of having a physician who becomes a mother from a modified version of our triple-difference model (Equation 2). Relative to our baseline model, we remove our controls for doctor relationship and calendar time from X_{pgt}. The remaining controls in X_{pgt} are two-way fixed effects for event-time interacted with physician gender and parent status. Panel A presents coefficients from an analysis of child patients, while Panel B presents coefficients from an analysis of adult patients. The odd-numbered columns show the estimates from the baseline model, while the even-numbered columns show the estimates when we remove these controls. Standard errors are clustered at the attributed physician level.

Table A12: Impacts on Children, Using Borusyak, Jaravel, and Spiess Imputation Estimator

	Office visits			Vaccinations		Other medical care		Enrollment
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Attributed PCP claims	Total claims	Familiarity with doctor (weeks)	All vaccination claims	Non-seasonal vaccination claims	Pharmacy claims	Emergency care claims	Enrolled this quarter
A. Children								
Quarter of Child Birth x Mom	-0.414***	-0.243**	-8.565***	-0.260***	-0.205***	-0.050	-0.010	-0.000
	(0.079)	(0.100)	(2.619)	(0.091)	(0.074)	(0.060)	(0.016)	(0.017)
1-7 Quarters Post-Birth x Mom	-0.113**	-0.115*	-7.466*	-0.206**	-0.178**	0.024	-0.018	0.001
	(0.047)	(0.065)	(4.058)	(0.085)	(0.072)	(0.020)	(0.014)	(0.017)
Outcome Mean Pre-Birth	0.471	1.503	25.369	0.396	0.321	1.119	0.254	0.818
Observations	3,021,981	3,021,981	1,429,900	3,021,981	3,021,981	3,021,981	3,021,981	3,021,981
Doctors	1,370	1,370	1,370	1,370	1,370	1,370	1,370	1,370

Notes: This table presents estimates of the impact of having a physician who becomes a mother from a modified version of our triple-difference model (Equation 2). Specifically, we apply the imputation-based approach developed by Borusyak, Jaravel and Spiess (2024), which is robust to treatment effect heterogeneity. Similar to our baseline model, we include two-way fixed effects for gender-by-event-time and parent-by-event-time, and allow each of these coefficients to vary with the calendar quarter and year of childbirth. We also control for gender-by-event time and parent-by-event-time interacted with the length of a patient's relationship with a physician (at baseline). Standard errors are clustered at the physician level.