Antenatal maternity leave and childbirth in the U.S.

Extended Abstract for PAA Submission

Julia Goodman

Background

A majority of American women work during pregnancy, increasingly working full-time and into the last month before delivery. Despite these trends, very little research has examined whether working until delivery has a negative impact on women's experience during and immediately after childbirth. Antenatal maternity leave (ANL), not uniformly available in the United States, may provide an opportunity for pregnant women to rest and prepare for delivery, reducing the likelihood that they arrive at the hospital already exhausted and potentially reducing adverse outcomes, including labor induction, prolonged labor duration, and delivery by unplanned Cesarean-section. Several mechanisms could link ANL with these outcomes, including direct effects on prenatal health, sleep and fatigue near the end of pregnancy leading to exhaustion at the inception of labor, maternal self-efficacy, or some combination of these. As my interest lies in the net effect of ANL policies, I do not attempt to analyze possible mechanisms.

A very small literature examines the relationship between ANL and maternal health and has found inconsistent results due to several important limitations – such as imprecise measurement of exposure and outcomes and failure to include important covariates – that I hope to address in my paper. Furthermore, prior research does not adequately address selection concerns stemming from the endogeneity of ANL. Women who take ANL may differ from those who don't in important and unobserved ways that may relate to childbirth.

To address these selection concerns, I **e**xploit variation across states in access to paid antenatal maternity leave. Five states (CA, HI, NJ, NY, and RI) allow use of their states' temporary disability insurance (TDI) program for pregnancy- and childbirth-related leave, including antenatal leave. Women in these states have greater access to paid antenatal maternity leave than women in other states.

Data:

Listening to Mothers (LTM), a national survey of women who gave birth to singletons in U.S. hospitals in 2005 (wave II) or 2011-12 (wave III), includes detailed questions about women's experiences during pregnancy, labor and delivery, and postpartum. Each wave includes a baseline survey conducted 1.5-17 months postpartum and a follow-up survey conducted 7-20.5 months postpartum. In wave III, employment and maternity leave questions were only asked in the follow-up survey. The combined sample of wave II and wave III follow-up consists of 2,745 women. Eligible women were between 18 and 45, had given birth during the target period in a U.S. hospital to a singleton, have that child still living at the time of interview, and were able to respond to a survey in English.

The data are weighted to more accurately reflect the target population of women delivering singletons in U.S. hospitals. Demographic variables used for weighting include educational attainment, age, race/ethnicity, geographic region, household income, and time elapsed since last giving birth, using data from the March 2005 and March 2011 Supplements of the U.S. Census Bureau's Current Population Survey and national natality data.

I exclude women who stopped working more than four weeks before delivery because longer leave may indicate health problems that may be independently associated with adverse health outcomes. Furthermore, women who stop working more than two months before delivery more likely have quit or been fired than women who stop later, according to U.S. Census data from 2006-2008. I also exclude women who delivered preterm (<37 completed weeks of gestation) because these women did not have equal opportunity to take antenatal leave before delivery and women who were self-employed since their opportunities for antenatal leave look very different from women employed by others.

After excluding women who took more than four weeks of maternity leave before delivery, women who delivered preterm, and those who were self-employed or not employed during pregnancy, my study sample includes 1,158 women. Of those, 314 were employed part-time and 844 were employed full-time.

Independent variable:
The explanatory variable of interest is whether women took maternity leave in the 9th month of pregnancy. I focus on leave taken in the last month of pregnancy because antenatal leave longer than four weeks for a normal, healthy pregnancy is relatively unusual in the United States, so these women may differ along important dimensions from women who take shorter leaves. Women who take longer antenatal maternity leaves may do so for health reasons independently associated with perinatal outcomes. Additionally, in states that allow temporary disability insurance to be used for pregnancy-related leave, the standard allowance for women with a normal pregnancy is four weeks before delivery.

I hold no prior hypothesis about exactly how much antenatal leave should influence obstetric outcomes. For this reason, I primarily focus on a binary indicator for leave taken in the last month of pregnancy relative to no leave taken in the last month of pregnancy. I will also examine the duration of leave, although small numbers may prevent strong conclusions about the duration of leave.

Dependent variables:
I am broadly interested in what impact ANL has on maternal health, so I will eventually include a set of outcomes that I hope will capture this relationship: gestational length, whether labor was induced, labor duration, use of epidural pain medication during labor, self-reported pain, mode of delivery (C-section, instrumental vaginal delivery, non-instrumental vaginal delivery), feeling unprepared for delivery, satisfaction with birth experience, breastfeeding initiation, and post-partum depression. At this stage, only delivery by primary (no prior C-sec), unplanned C-section has been analyzed.

I focus on primary, unplanned C-section because the incidence of planned and repeat C-sections does not likely respond to women's fatigue and preparedness for labor since most result from pre-existing health conditions or provider/hospital practices (e.g., comfort with vaginal birth after Cesarean (VBAC), vaginal delivery of breech-presenting babies). Incidence of unplanned, primary C-section, on the other hand, results when women attempt a vaginal birth (either for the first time or after successfully delivering vaginally in the past) but end up delivering by C-section. Women who delivered by C-section were asked whether the Cesarean was planned (was the decision made before she went into labor) or unplanned.

Covariates:
Control variables include maternal age, marital status, parity, education, and race/ethnicity; maternity care payment type (Medicaid or other); pre-pregnancy BMI; infant birthweight; employment status (full-time or part-time); and maternal health characteristics. Because obstetric complications more frequently occur among nulliparous women, I will stratify my analyses on parity, looking at first-time mothers separately from experienced mothers.

Methods:
I will employ both OLS multivariable regression and difference-in-difference (DD) approaches. My DD analysis exploits state-level variation in access to paid leave through TDI laws – laws affecting only women who were employed during pregnancy. Employed women in the 5 TDI states were approximately 25 percentage points more likely to take ANL than employed women in other states, even after adjusting for covariates (data not shown). Using non-employed women to capture baseline state-level variation in outcomes, I examine the additional difference between states among employed women.

My primary equation of interest is:

$$Y_i = \beta_0 + \beta_1 TDI_i + \beta_2 employed_i + \beta_3 TDI * employed_i + \beta_4 X_i + \varepsilon_{1i}$$

Where Y_i refers to each of my outcomes of interest, TDI is residence in one of 5 states with TDI laws, employed is a binary indicator for women who were employed during pregnancy and X is a vector of covariates (specified above). β_3, my coefficient of interest, measures the impact of TDI among employed women on the outcomes.

Since I include numerous outcomes, I will use Bonferroni correction to account for multiple comparisons. I will also conduct several falsification tests, such as comparing results using actual versus planned ANL.

Expected/Preliminary Results:
Summary statistics
55% of the employed women in this sample took up to one month of antenatal maternity leave. Women who took leave were slightly more likely to have a primary, unplanned C-section, had shorter labor durations, and were more likely to use an epidural for pain management, though none of these reached statistical significance (data not shown).

OLS regression
Table 1 shows OLS regression results of primary, unplanned C-section on ANL, with and without covariates, among selected subgroups. Women who took ANL were less likely to have a primary, unplanned C-section than women who did not, with the relationship apparently being driven by first-time mothers and women who worked full-time during pregnancy. Among women giving birth for the first time and who worked full-time, ANL was associated with a 9 percentage point decrease in the likelihood of a primary, unplanned C-section ($p<0.05$).

Difference-in-difference
Figure 1 illustrates the unadjusted relationship between residence in a TDI state and primary, unplanned C-section among both employed and non-employed women. This graph shows that there was no difference in this outcome between TDI and non-TDI states among women who were not expected to be affected by the laws (those who did not work during pregnancy), but TDI was associated with fewer primary, unplanned C-sections among employed women.

The multivariable, stratified DD results indicate that employed women giving birth for the first time who lived in TDI states were 12.1 percentage points ($p=0.055$) less likely to have a primary, unplanned C-section than comparable women who lived in other states, after adjusting for covariates. There was no significant relationship among experienced mothers.

Future analyses will draw from national Vital Statistics data to determine state-level baseline C-section rates, rather than comparing using a relatively small sample of non-employed women from this dataset.

Table 1. Coefficients and 95% CI for OLS regression of primary, unplanned C-section on ANL and ANL*parity with and without covariates, by selected subgroups. LTM waves II & III. N = 1157 employed women who delivered at term and did not take > 4 weeks ANL.

	Unadjusted	Adjusted	Interaction with parity	Nulliparas only	Multiparas only	Full-time only	Part-time only	Full-time nulliparas only
ANL	**-0.042**	**-0.027**	0.003	**-0.058**	**0.017**	0.007	0.013	**-0.09**
	[-0.095 - 0.011]	**[-0.078 - 0.023]**	[-0.038 - 0.045]	**[-0.151 - 0.036]**	**[-0.020 - 0.053]**	[-0.034 - 0.048]	[-0.088 - 0.114]	**[-0.179 - -0.001]***
ANLxparity			**-0.069**			**-0.098**	**0.016**	
			[-0.161 - 0.023]			**[-0.188 - -0.008]***	**[-0.185 - 0.217]**	
Nulliparous		0.233	0.269			0.276	0.193	
		[0.162 - 0.304]**	[0.190 - 0.347]**			[0.196 - 0.356]**	[0.024 - 0.361]*	
HS		0.007	0.001	0.097	-0.041	-0.013	0.05	0.11
		[-0.052 - 0.065]	[-0.058 - 0.061]	[-0.058 - 0.251]	[-0.086 - 0.004]+	[-0.077 - 0.050]	[-0.063 - 0.164]	[-0.060 - 0.281]
Some college		0.019	0.016	0.102	-0.045	-0.023	0.12	0.073
		[-0.031 - 0.068]	[-0.034 - 0.066]	[0.009 - 0.195]*	[-0.103 - 0.013]	[-0.082 - 0.037]	[0.016 - 0.223]*	[-0.033 - 0.179]
Black/African American		0.016	0.014	0.025	0.011	0.036	0.005	0.091
		[-0.055 - 0.087]	[-0.056 - 0.084]	[-0.108 - 0.159]	[-0.053 - 0.076]	[-0.053 - 0.126]	[-0.098 - 0.109]	[-0.082 - 0.265]
Hispanic		-0.01	-0.012	-0.003	-0.023	-0.023	0.019	-0.02
		[-0.059 - 0.039]	[-0.062 - 0.037]	[-0.103 - 0.097]	[-0.083 - 0.038]	[-0.090 - 0.044]	[-0.114 - 0.152]	[-0.160 - 0.119]
Other		-0.044	-0.039	-0.097	-0.041	-0.037	-0.027	-0.01
		[-0.102 - 0.015]	[-0.099 - 0.022]	[-0.227 - 0.034]	[-0.074 - -0.007]*	[-0.097 - 0.023]	[-0.231 - 0.178]	[-0.261 - 0.241]
Medicaid		0.017	0.016	0.003	0.017	-0.021	0.049	-0.071
		[-0.049 - 0.084]	[-0.051 - 0.083]	[-0.151 - 0.157]	[-0.051 - 0.086]	[-0.082 - 0.041]	[-0.085 - 0.183]	[-0.225 - 0.083]
Obese		0.089	0.088	0.128	0.066	0.133	-0.004	0.17
		[0.024 - 0.153]**	[0.024 - 0.152]**	[0.022 - 0.234]*	[-0.013 - 0.146]+	[0.060 - 0.205]**	[-0.108 - 0.100]	[0.053 - 0.287]**
Maternal age		0.061	0.058	0.134	-0.014	0.075	0.023	0.143
		[0.016 - 0.105]**	[0.013 - 0.104]*	[0.068 - 0.200]**	[-0.075 - 0.047]	[0.039 - 0.112]**	[-0.094 - 0.140]	[0.076 - 0.210]**
Age squared		-0.001	-0.001	-0.002	0	-0.001	0	-0.002
		[-0.002 - -0.000]*	[-0.002 - -0.000]*	[-0.003 - -0.001]**	[-0.001 - 0.001]	[-0.002 - -0.001]**	[-0.002 - 0.002]	[-0.003 - -0.001]**
Wave III		0.014	0.014	0.054	-0.019	0.018	0.005	0.065
		[-0.039 - 0.068]	[-0.039 - 0.067]	[-0.043 - 0.152]	[-0.074 - 0.036]	[-0.035 - 0.071]	[-0.119 - 0.129]	[-0.037 - 0.168]
2+ prior births					-0.014			
					[-0.050 - 0.022]			
Constant	0.157	-0.985	-0.962	-1.9	0.224	-1.143	-0.588	-1.983
	[0.120 - 0.195]**	[-1.643 - -0.327]**	[-1.629 - -0.296]**	[-2.923 - -0.877]**	[-0.673 - 1.122]	[-1.725 - -0.561]**	[-2.302 - 1.126]	[-2.962 - -1.004]**
N	1157	1144	1144	559	585	831	313	414
R-squared	0.004	0.131	0.133	0.095	0.045	0.16	0.136	0.099

Robust 95% confidence intervals in brackets. Std. errors adjusted for state clustering. * significant at 5%; ** significant at 1%

Figure 1. Unadjusted DD estimates. LTM waves II & III. N = 1157 employed women and N = 856 not employed women who delivered at term.