Appendix I: Findings from subgroup analyses of FMLA and paid FML programs

The subgroup findings of a select group of studies are detailed below. We begin with an implementation study and then present the articles in chronological order.

Klerman, et al. (2012). Department of Labor 2012 Worksite and Employee Surveys

In 2011, the Department of Labor commissioned Worksite and Employee Surveys to capture employer and employee experiences with family leave and the FMLA.[1] Between February and June of 2012, 1,812 worksites and 2,852 employees were surveyed. According to the survey, 59% of employees are eligible[2] for FMLA leave.

Leave-taking:

- Among FMLA eligible employees, workers with at least one child are significantly more likely to take leave (19.5%) than workers with no children (13.2%). No other subgroup differences in leave-taking rates were significant among FMLA eligible employees, although there were differences by gender among all employees, regardless of FMLA eligibility.
- Among FMLA-eligible employees, women were significantly more likely to have needed but not taken leave in the past 12 months compared to men (6.4% compared to 3.3%); non-married workers were more likely to have needed but not taken leave in the past 12 months compared to married workers (6.5% compared to 3.6%); workers with at least one child were significantly more likely to have needed but not taken leave in the past 12 months compared to workers with no children in the house (6.8% compared to 3.3%); and workers with incomes below $35,000 were significantly more likely to have needed but not taken leave in the past 12 months compared to workers with higher incomes (11.2%). No significant differences were found by race (white vs. non-white), ethnicity

(Hispanic vs. non-Hispanic) or education level.
- Among FMLA-eligible employees who needed but did not take leave in the past 12 months, 36.6% of workers with a family income below the median reported they did not take leave because they could not afford to take an unpaid leave, compared to 53.3% of workers with a family income above the median. While this difference is not statistically significant, it is unexpected.

Family economic stability:
- Among all employees who took leave in the past 12 months (whether they were eligible for FMLA leave or not), those with family income below the median were significantly less likely to receive full pay during their leave (34%), and significantly more likely to receive no pay during their leave (53%), compared to employees with family income above the median (63% and 18%, respectively).

Gender equality:
- Significantly fewer FMLA-covered worksites did not offer paid maternity leave to any employees (40.5%) compared to non-FMLA covered worksites (78.3%). Similarly, significantly fewer FMLA-covered worksites did not offer paid paternity leave to any employees (58.1%) compared to non-FMLA covered worksites (85.6%) For both types of worksites, paid paternity leave is less common.
- Among all employees who took leave for parental reasons in the past 12 months (whether they were eligibility for FMLA or not), 21% of women received pay, compared to just 13% of men, although this difference is not statistically significant.
- Among all employees, women were significantly more likely to take leave for FMLA qualifying reasons (15.2% compared to 11.4% leave-taking for men), and to have needed but not taken leave (6.1% compared to 3.2% for men) in the past 12 months.

Waldfogel. (1999). The impacts of the Family and Medical Leave Act

This study examined the effects of the FMLA on leave coverage overall, as well as on mothers' leave-taking, employment and wages.[3] All analyses, except employment outcome analyses, were run separately by firm size (small, medium, large) to detect whether effects varied. Employment analyses were not run by firm size because this variable could not apply to the unemployed. Race and income were used as control variables in all or some of the models, respectively. However, the author did not conduct subgroup analyses by race/ethnicity, socioeconomic status or gender.

Leave-taking by firm size:

The author hypothesized that if the FMLA increases leave-taking, these increases are expected to be largest among women with children or infants (who are more likely to need leave to care for children than childless women or men) in states that had no prior maternity laws. However, this effect might vary by firm size, since the FMLA may influence leave coverage differently for firms of different sizes. As expected, the study found differential impacts by firm size:
- Large firms: Leave-taking increased significantly after the FMLA was passed for women with children and infants across all states, regardless of whether the state had a prior maternity law or not ($p<0.05$). The increases were especially substantial for women with infants (16% to 18%) and were larger than increases experienced by comparison groups ($p<0.05$). The fact that leave-taking rates rose across all states, not just those with no prior maternity leave laws, supports the theory that large firms already offered leave benefits regardless of state or federal law, but the passage of the FMLA either expanded coverage

or increased awareness of leave benefits among employees. In other words, the findings suggest that the FMLA was associated with greater leave-taking among already covered employees.

- Medium-sized firms: Leave-taking increased significantly after the passage of the FMLA for women with children and women with infants in states that did not have prior maternity leave laws ($p<0.05$).[4] For women with infants, the increase was a substantial 23% ($p<0.05$). In contrast, childless women and men (comparison groups) in states with no prior laws showed only small significant increases or no increases in leave-taking, respectively. This finding supports the theory that the FMLA required medium-sized firms to offer leave coverage, thereby increasing leave-taking among newly covered employees.
- Small and very small firms: The FMLA was not consistently associated with significant changes in leave-taking among workers in small firms.

As expected, the results indicate that the FMLA most affected leave-taking for mothers with infants in both large- and medium-sized firms. For large firms, increases in leave-taking occurred across all states, regardless of prior leave laws, suggesting that the FMLA did not increase leave-taking by directly changing leave policies, but rather by leading to expanded coverage or utilization. For medium-sized firms, increases in leave-taking were confined to states with no prior leave laws, suggesting that medium-sized firms were most sensitive to the FMLA legislation and made changes to their leave policies.

Han, et al. (2009). Parental leave policies and parents' employment and leave-taking

This study assessed the effects of federal and state parental leave legislation on parents' employment and leave-taking immediately after the birth of a child.[5] Authors examined outcomes for both mothers and fathers between 1987 and 2004. The study included three types of parental leave laws: the FMLA, state unpaid parental leave legislation (in seven states) and paid leave through state Temporary Disability Insurance (TDI) programs (in five states). Authors used a difference-in-difference (DD) model to compare labor force outcomes (employment and leave-taking) between new parents and soon-to-be parents (who would have a birth in about one year) in states with vs. without enacted parental leave legislation. The study also examines employment and leave-taking impacts by parental education (less than college vs. some college or more) and maternal marital status (married or single). These subgroups were chosen because (1) parents of higher socioeconomic status may be more likely to be covered by and able to take advantage of unpaid parental leave laws, and (2) married women are more likely to be covered by leave and more likely to be able to afford unpaid leave.

Results by parental education:

- Significant associations between parental leave laws and increased leave-taking were found in the birth month and two following months for college-educated mothers (birth month and any leave $p<0.01$, one month after and any leave $p<0.001$, two months after and any leave $p<0.05$). Conversely, mothers who are less than college educated did not experience increases in leave-taking associated with parental leave laws, and in some cases experienced a decrease in leave-taking.
- For fathers, significant associations between parental leave laws and increased leave-taking were found in the birth month for college-educated fathers ($p<0.05$), but no associations were found for less-than-college-educated fathers. Fertility data were only available for fathers who were married to and cohabiting with the child's mother. Therefore, paternal leave-taking and employment were not estimated for single or non-cohabitating fathers.

Results by maternal marital status[6]:

- Parental leave laws were significantly associated with increased leave-taking among married mothers, but not single mothers (birth month and any leave $p<0.05$, one month after birth and any leave $p<0.001$, two months after and any leave $p<0.10$).
- Based on these results, it appears that parental leave legislation only positively impacted leave-taking for new parents of higher socioeconomic status, but not for more vulnerable parents.

Rossin. (2011). The effects of maternity leave on children's birth and infant health outcomes

This study[7] examined the effects of unpaid FMLA maternity leave on child birth outcomes, infant mortality and birth parity.[8] The study first used a DD model, which examined the difference in health outcomes of children born before vs. after the passage of the FMLA in 1993, in states that had prior maternity leave policies (control states) vs. states that did not (treatment states). However, the preferred model was a Difference-in-Difference-in-Difference (DDD) model, which examined the difference in health outcomes of children born to mothers who were likely FMLA eligible vs. likely FMLA ineligible, before vs. after the passage of the FMLA in 1993, in control states vs. treatment states.

The study examines how FMLA effects on child health outcomes and birth parity differ by educational attainment and marital status of mothers. Subgroup analyses compared the effects of the FMLA on:

- College-educated and married mothers, who are more likely to be eligible for FMLA and able to take unpaid leave; and
- Less than college-educated and unmarried mothers, who are less likely to be eligible for the FMLA or able to afford unpaid leave.

The study found larger and more statistically significant positive effects on birth outcomes and infant mortality for college-educated and married women, but larger effects on increased first parity births and decreased later-parity births for less than college-educated and unmarried women. More specifically:

Birth outcomes:

- For the college-educated and married sub-sample, the FMLA was associated with larger and more statistically significant positive effects on birth weight and likelihood of premature birth ($p<0.05$) than for the less-educated and unmarried sub-sample. The author hypothesizes that this could be because college-educated and married mothers may be able to afford longer unpaid leaves than less-educated and unmarried mothers because they may have jobs with better benefits and spouses with a second income.

Infant mortality:

- For the college-educated and married sub-sample, the FMLA was associated with a reduction in the overall infant mortality rate by six deaths per 10,000 births ($p<0.001$). The FMLA was not associated with any effect on the overall number of births, so these are not driven by an increase in births.
- For the less-educated and unmarried sub-sample, the FMLA was not associated with any statistically significant effects on infant mortality. The author indicates that this finding suggests that "the children of these mothers were unaffected by FMLA's unpaid leave."

Birth parity:

- For the less-educated and unmarried sub-sample, the FMLA was associated with a

statistically significant increase in first parity births ($p<0.05$) and decrease in second parity births ($p<0.05$), while for the college-educated and married sub-sample, the FMLA was only associated with a decrease in second parity births of a smaller magnitude ($p<0.05$).

The author indicates that the less-educated and unmarried sub-sample drove the birth parity findings because prior to the job-protected maternity leave under the FMLA, the cost of childbirth was too great for these women since they were less likely to have a safety net to fall back on if they lost their jobs. However, these women may still not be able to afford longer maternity leave due to the unpaid nature of FMLA leave, which is why college-educated and married women (who may have more resources) drive the findings of improved child health outcomes. Thus, the author cautions that the FMLA may contribute to increased health disparities between children in more vs. less advantaged families: "an unpaid maternity leave policy may actually increase disparities because it only benefits those mothers who can afford to take it."

No subgroup analyses were conducted by race/ethnicity, although race/ethnicity was used as a control in the regression models.

Rossin-Slater, et al. (2013). The effects of California's paid family leave program on mothers' leave-taking and subsequent labor market outcomes

In 2002, California passed the first paid FML program in the nation. California paid FML provides partial wage replacement to employees who need time off from work to care for a new child (birth, adoption, foster) or a seriously ill family member. Research indicates that the benefits of *unpaid* family leave are primarily felt by socioeconomically advantaged mothers. However, by making leave from work more affordable, paid family leave might be more effective in reducing inequities in leave-taking for vulnerable mothers. Thus, in addition to overall impacts, the study investigated the effects of the California paid FML program on maternity leave-taking for specific subgroups of mothers stratified by: education, marital status and race/ethnicity.[9]

To evaluate these effects, the study used a DD design that examined, for each subgroup, changes in outcomes for California working mothers of infants before and after California paid FML implementation, compared to corresponding differences for comparison groups unlikely to be affected by California paid FML.

Results found that the California paid FML program is associated with reductions in disparities in mothers' leave-taking. All mothers experienced an increase in leave-taking, but the magnitude was greater for disadvantaged mothers. Specifically:

- Education: Maternity leave-taking increased five percentage points for new mothers with a high school degree or less ($p<0.05$). Considering the increases in light of baseline usage, maternity leave-taking time increased from one to four weeks on average for those with a high school degree or less. In comparison, college educated mothers increased their average time of leave from three to five weeks to six to seven weeks.
- Marital status: Maternity leave-taking increased by 7.2 percentage points for unmarried mothers ($p<0.05$) compared to 6 percentage points for married mothers ($p<0.05$). Considering the increases in light of baseline usage, maternity leave-taking increased fivefold for unmarried mothers (an increase of one to five weeks average time on leave). The mean leave length for married mothers rose from three to five weeks to six to seven weeks.
- Race/ethnicity: Leave-taking increased 10.6 and 6.2 percentage points for black and Hispanic mothers, respectively. Considering the increases in light of baseline usage,

maternity leave-taking time increased from one to two weeks to six weeks on average for black mothers (not significant) and five weeks on average for Hispanic mothers ($p<0.05$). For non-Hispanic white mothers, their average time of leave increased from three to five weeks to six to seven weeks.

Therefore, overall, the California paid FML program is associated with a reduction in leave-taking disparities for vulnerable mothers.

Das & Polachek. (2015). Unanticipated effects of California's paid family leave program

This study examined the effects of the California paid FML program, implemented in July 2004, on women's labor force participation rates, unemployment rates and unemployment duration using a DD model and CPS data from 1996-2009.[10] Although the model controlled for average education, the proportion married, per capita state income, the proportion self-employed, age, year fixed-effects and cohort and time effects, outcomes were not reported by subgroup.

Byker. (2016). Paid parental leave laws in the United States: Does short-duration leave affect women's labor-force attachment?

Using the Survey of Income and Program Participation (SIPP) panel data from 1996-2008, the author used an event-study DD strategy to estimate the work trajectories of women 24 months before and 24 months after a birth, both before and after the implementation of a California and New Jersey's paid FML programs relative to Texas, Florida and New York.[11]

Compared to the comparison group states, paid FML had a positive impact on mothers' labor force participation in the six months centered around a birth. The author ran the model separately for mothers with less than a bachelor's degree and with at least a bachelor's degree. She found that the increase of labor force participation was driven by women with less than a bachelor's degree ($p<0.05$) rather than women with at least a bachelor's degree, which is notable since women with lower education levels have less access to employer-sponsored paid leave in the absence of a state mandate. Further, women with less than bachelor's degrees experienced an increase in the weeks spent with a job around a birth after California and New Jersey FML implementation, and a decrease in the number of weeks spent searching for a job six to 12 months post-partum ($p<0.05$) compared to women who gave birth in comparison states.

Lichtman-Sadot & Bell. (2017). Child health in elementary school following California's paid family leave program

This study used three cohorts from the Early Childhood Longitudinal Study (ECLS) (the 1998-1999 and 2010-2011 kindergarten surveys and the ECLS-B birth cohort in 2001) from the National Center for Education Statistics (NCES) to assess the impact of California paid FML on children's health outcomes in early elementary school.[12] The authors employed a DD strategy to compare health outcomes of children ages five and six born in California pre and post-paid FML implementation relative to children outside of California. The authors address whether health improvements pre and post-paid FML in California relative to other states depend on child characteristics. Findings by subgroups are as follows:

- Overall, after California paid FML's implementation, children with low socioeconomic status (SES) and those with mothers having less than a high school diploma drove decreases in risk of obesity and diagnosis of ADHD. The authors did not examine differential impacts by race/ethnicity.
    - SES: Reductions in risk of overweight and diagnosis of ADHD between the pre-

and post- study periods occurred for children in the lowest SES quartile by 9.7 ($p<0.01$) and 3.1 ($p<0.05$) percentage points, respectively.

- Mother's educational attainment: Reductions in risk of overweight and diagnosis of ADHD between the pre- and post- study periods occurred for children with mothers having less than a high school diploma by 14.7 ($p<0.01$) and 3.7 ($p<0.05$) percentage points, respectively. Additionally, there was a 6.5 percentage point reduction in overweight for children with mothers who have a bachelor's degree ($p<0.1$) after the introduction of California paid FML.

- English as second language: After the implementation of California paid FML, diagnosis-dependent conditions decreased the most among children for whom English was their first language. Diagnoses decreased for ADHD by 1.6 percentage points ($p<0.1$), hearing problems by 2.6 percentage points ($p<0.01$) and frequent ear infections by 5.9 percentage points ($p<0.05$) for this group compared to children for whom English was their second language. For health outcomes that are not diagnosis-based (overweight and health scale), the opposite is true (i.e., non-diagnosed outcomes decreased for children with English as a second language). The authors suggest that this data indicates reduced awareness or access to health professionals among immigrant populations leads to under diagnosis for diagnosis-based health conditions.
- Gender: Boys were almost three times as likely to be diagnosed with ADHD than girls ($p<0.01$), which is consistent with previous evidence that shows the male population is more susceptible to many health conditions. However, after the implementation of California paid FML, male instances of overweight, diagnosis of ADHD, hearing problems and frequent ear infections decreased by 6.4 percentage points ($p<0.01$), 2.4 percentage points ($p<0.05$), 2.7 percentage points ($p<0.01$), and 4.9 percentage points ($p<0.1$), respectively. This percentage point increase was greater than the percentage point decreases exhibited by girls.

Arora & Wolf. (2018). Does paid family leave reduce nursing home use? The California experience

The authors used longitudinal, aggregate state-level data spanning from 1999-2008 for all 50 states and the District of Columbia to study the impact of California paid FML on nursing home usage. Nursing home utilization – the outcome measure – equaled the proportion of a state's older population that resides in a nursing home at any time during a calendar year.[13] There were no reported paid FML findings by subgroups.

Hamad, Modrek & White. (2018). Paid family leave effects on breastfeeding: A quasi-experimental study of U.S. policies

This study used a DD approach to examine changes in breastfeeding practices before and after the implementation of paid FML policies in California and New Jersey compared to other states without paid FML policies using the 2003-2015 National Immunization Survey (NIS).[14] The treatment group was defined as children born in California and New Jersey before and after the respective states' paid FML program was implemented.

Overall, there were mixed results in the effect of paid FML implementation on breastfeeding practices among subgroups although several outcomes consistently improved among married, white, higher-income and older mothers. Hispanic mothers had improved breastfeeding at six months. Specifically:

- Marital status: Relative to unmarried mothers, after paid FML implementation, married

mothers showed improvements in exclusive breastfeeding at three months ($p<0.05$), exclusive breastfeeding at six months ($p<0.01$), any breastfeeding at six months ($p<0.001$), any breastfeeding at 12 months ($p<0.01$) and exclusive breastfeeding duration ($p<0.05$).

- Race: Relative to white mothers, after paid FML implementation, black mothers had reduced breastfeeding at 6 ($p<0.05$) and 12 months ($p<0.01$) and reduced breastfeeding duration ($p<0.001$). Hispanic mothers had improved exclusive breastfeeding at six months ($p<0.001$) and mothers of other races showed reductions in ever breastfeeding ($p<0.05$).
- Income: Relative to low-income mothers, after paid FML implementation, middle- and high-income mothers increased instances of ever breastfeeding ($p<0.001$), exclusive breastfeeding at three months ($p<0.001$), and breastfeeding duration ($p<0.001$).
- Age: Relative to older women, after paid FML implementation, there was reduced breastfeeding duration in women younger than 30 years old ($p<0.001$).
- State: The authors also ran the data separately by state and found that paid FML had a more positive impact on breastfeeding in New Jersey compared to California. New Jersey paid FML policy improved breastfeed practices across all outcomes ($p<0.001$ for ever breastfed, exclusive at three months, breastfeed at 12 months, breastfeeding duration and exclusive breastfeeding duration; $p<0.01$ for exclusive at six months), except breastfeeding at six months. However, California paid FML resulted in both improvements (in exclusively breastfed at six months; $p<0.001$) and negative effects (in ever breastfed, exclusively breastfed at three months, breastfeeding duration and exclusive breastfed duration; $p<0.001$). These differential effects could be attributable to variation in state policy approaches or employment and actual leave-taking behavior (which are not available in the data set).

Endnotes and citations

1. Klerman, J. A., Daley, K., & Pozniak, A. (2012). *Family and medical leave in 2012: Technical report.* Retrieved from website: https://www.dol.gov/asp/evaluation/fmla/fmla2012.htm.
2. 'Eligible employees ' refer to employees who work for a FMLA covered worksite and meet FMLA eligibility criteria. An FMLA covered worksite is any public agency, any public or private elementary or secondary school, or all private firms that employ at least 50 workers within 75 miles. To be eligible for FMLA leave, and employee must work for a covered firm or agency, have 12 months of tenure with the firm, and have worked for the firm/agency for at least 1,250 hours in the past year. For more details on FMLA eligibility criteria, see the FMLA Capacity Section.
3. Waldfogel, J. (1999). The impact of the Family and Medical Leave Act. *Journal of Policy Analysis and Management, 18*(2), 281-302. doi:10.1002/(SICI)1520-6688(199921)18:2<281::AID-PAM5>3.0.CO;2-J.
4. This finding can be interpreted as follows, as an example: Examining the change in leave-taking before and after the passage of the FMLA in states that did not have prior leave laws (and so should be more affected by the FMLA) compared to the change in leave-taking before and after the passage of the FMLA in states that did have prior leave laws (and so should be less affected by the FMLA), the author found that this state-level difference in pre/post-FMLA changes in leave-taking was statically significantly more positive (a greater increase) for mothers of children under 18 or infants (who are more likely to need FMLA leave), than for childless women or men (who are less likely to need FMLA leave). This finding only applied to workers in medium-sized firms.
5. Han, W. J., Ruhm, C., & Waldfogel, J. (2009). Parental leave policies and parents' employment and leave-taking. *Journal of Policy Analysis and Management, 28*(1), 29-54. doi:10.1002/pam.20398.
6. Fertility data was only available for fathers who were married and cohabiting with the child's mother; therefore, it was not possible to conduct subgroup analyses by father's marital status.
7. Rossin, M. (2011). The effects of maternity leave on children's birth and infant health outcomes in the United States. *Journal of Health Economics, 30*(2), 221–239. doi:10.1016/j.jhealeco.2011.01.005.
8. The study examined first-time births to mothers compared to second-time births or higher. Second or later births are associated with better health outcomes due to a better in-utero environment, and therefore may mediate the relationship between child health outcomes and the FMLA.
9. Rossin-Slater, M., Ruhm, C. J., & Waldfogel, J. (2013). The effects of California's paid leave program on mothers' leave-taking and subsequent labor market outcomes. *Journal of Policy Analysis and Management, 32*(2), 224-245. doi:10.3386/w17715.
10. Das, T., & Polachek, S. W. (2015). Unanticipated effects of California's paid family leave program. *Contemporary Economic Policy, 33*(4), 619-635. doi:10.1111/coep.12102.
11. Byker, T. S. (2016). Paid parental leave laws in the United States: Does short-duration leave affect women's labor-force attachment? *American Economic Review, 106*(5), 242-246. doi:10.1257/aer.p20161118.
12. Lichtman-Sadot, S., & Bell, N. P. (2017). Child health in elementary school following California's Paid Family Leave program. *Journal of Policy Analysis and Management, 36*(4), 790-827. doi:10.1002/pam.22012.
13. Arora, K., & Wolf, D. A. (2018). Does paid family leave reduce nursing home use? The California experience. *Journal of Policy Analysis and Management, 37*(1), 38-62. doi:10.1002/pam.22038.

14. Hamad, R., Modrek, S., & White, J. S. (2019). Paid family leave effects on breastfeeding: A quasi-experimental study of US policies. *American Journal of Public Health, 109*(1), 164-166. doi:10.2105/ajph.2018.304693.