

The Early Development and Health Benefits of Maternity Leave Mandates

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Abstract

We study the impact of an expansion of maternity leave mandates from 6 months to 12 months on the health and development of children. Our advantage relative to previous research lies in a compelling policy episode which improves the causal nature of inferences and a detailed data source which allows the investigation of more subtle health and development indicators. We estimate a substantial impact on time at home for mothers, but only limited impact on breast feeding and measures of infant health. On child development, we estimate a strong impact on the age at which milestones such as feeding and speaking are reached, as well as some indicators of an improved parental environment, but do not find strong evidence for a persistent impact of other measures such as motor-social development. These findings raise doubts about the efficacy of expanded leaves in having substantial impact on children's health.

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Introduction

Maternity leave mandates allow governments to significantly affect a child's environment at the start of life. While some of the arguments for these mandates have other foci—for example, enhancing the continuity of mothers' labour market careers—most are firmly rooted in child welfare. Mandates vary widely in both duration and income replacement across countries. Some of the most generous are found in Europe where leaves can be up to a year long at full salary. In contrast, leaves in Australia and the United States are short and/or unpaid. A possible explanation of this revealed disagreement about the value of leaves is that evidence of their benefit is based on correlational rather than causal inferences, and in some cases not widely replicated.

In this paper we examine the effects of maternity leave mandates on a wide array of infant health and developmental outcomes, as well as some indicators of mother and family well being. The basis of our inference is a dramatic extension in the duration of job protected maternity/parental leave in Canada in 2000/01. Whether purposely or not, Canada's mandates have historically stuck a compromise between the European and Australian/U.S. models; modest leave duration combined with modest income replacement provided through the unemployment insurance system (called Employment Insurance in Canada). In 2000/01 the duration of leave was extended from roughly 6 months to one year. This episode, therefore, can potentially inform both the current constellation of extended leaves in Europe, as well American and Australian policy makers seeking evidence of the value of longer mandates.

Our analysis also speaks directly to research that shows maternal employment in a child's first year of life can have long run detrimental effects on cognitive development (e.g., Baum 2003, Belsky & Eggebeen 1991, Ruhm 2004, Waldfogel et al. 2002 and review in Waldfogel

2006). While this body of research has highlighted the potential link between early maternal employment and longer-run outcomes, less is known about the mechanisms through which this occurs. With our data, we are able to explore detailed changes in infants' developmental environment in response to an exogenous change in parental care, thereby shedding light on the potential mechanisms.

Knowing more about the mechanisms is important for two reasons. First, it can provide further evidence on the credibility of the link between employment and longer run outcomes, checking that the long-run evidence isn't picking up other determinants of outcomes that vary for employed mothers. Second, knowing through which channels maternity leaves have their impact can provide important information for policy design. For these reasons, understanding the mechanisms is critical.

To examine the Canadian maternity leave mandate change we use data from the National Longitudinal Survey of Children and Youth (NLSCY). This survey is a nationally representative survey of Canada's children that follows their health and their cognitive, emotional, behavioural and motor development. Children exposed to the longer 12 month mandate are aged 0-29 months in data currently available, so we focus our study on this younger age group. Therefore, our results are for child development over the first two and a half years, leaving the study of older children to future work.

Our results focus on three aspects of maternity leave: labour market and childcare, breast feeding and health, and parenting and child development. For the first set of results, we find that, despite the relatively modest income replacement available in the Canadian system, maternal labour supply is quite responsive to the extension of maternity leave. Among mothers returning to work, we estimate an elasticity of the duration of time at home post birth with

respect to the leave mandate of about 0.7. The resulting increase in parental care (3.4 months) the children of these mothers receive, primarily between the ages of 7 and 12 months, displaces unlicensed non-parental care in another's home. If unlicensed non-parental care is of lower quality than parental care, then the extension of maternity leave has directly improved the care environment of these children.

Turning to our health results, we find that mothers' breastfeeding behaviour is much less responsive to the change in leave. We estimate an elasticity of the duration of breastfeeding with respect to the leave mandate of 0.18; the estimate for exclusive breastfeeding is 0.20. To our knowledge, these are the first estimates of this elasticity. As "work" is the leading reason for terminating breastfeeding among those who have breast fed for longer durations, understanding the relationship between work and breast-feeding is critical information for policy makers interested in lengthening breast feeding durations. Our results suggest that relaxing this constraint changes the period of breastfeeding rather modestly (just under 2.5 weeks).

Increased parental care/longer breastfeeding is thought to be beneficial to both mothers' and children's health. We find, however, mixed impact of the extension of the maternity leave mandate on measures of health in the NLSCY. The increased period of breast feeding does not appear to compromise infant health (as measured by weight), but only some of our health indicators indicate an effect – with chronic conditions, asthma and mother-reported infant health showing the most consistent beneficial results.

Finally, our results for parenting suggest that longer maternity leave leads to improved parenting that persists to older ages. We estimate significant reductions in the age of certain developmental milestones: when the child first feeds him/her self or speaks a first word. Regarding activities, some of our findings are as expected—increased participation in organized

parent/child playgroups and programs over the period of increased parental care. However, other results are less consistent with expectations—no changes in informal parent/child activities such as reading and walks, and a significant reduction in singing. We also do not find any effect on measures of infants' temperament, which are arguably related to the attachment and security they sense in their relationships with their parents. Finally, we find no effect on an index of motor and social development. Analysis of any longer term effects on cognitive ability awaits future waves of data that capture the treated children at older ages.

We tentatively conclude that longer maternity leave mandates do have significant effects on the developmental and care environments of infants under age one. They are not, however, very effective public policy instruments to influence the duration of breastfeeding. Also, we do not find an effect on a mechanism that obviously accounts for a relationship between early maternal employment and cognitive ability documented in previous research.

Maternity Leaves and Child Development

The connection between maternity leave mandates and child development appears to be neither simple nor transparent. Any pathway is predicated, however, on a causal link between the duration of the maternity leave mandate and the amount of time mothers stay at home post birth. In this section, we review the evidence linking maternity leaves and child development.

Both theoretical reasoning and empirical evidence reveal ambiguity in the link between mandates and development. Klerman and Leibowitz (1997) present a model of maternity leave mandates that demonstrates how a mandate can both induce some mothers to stay home longer with their newborns, but other mothers to return to work earlier. Studies of the U.S. Family and Medical Leave Act (FMLA) (or state specific initiatives that preceded it) report no effect on time

at home post birth or estimates that are sensitive to specification (e.g., Baum 2003b, Klerman and Leibowitz 1997, Waldfogel 1999). A recent study of leave mandates in Canada (Baker and Milligan 2005) reports that shorter mandates have little effect on the time mothers spend at home, while longer mandates do. All of this evidence is consistent with a model in which short mandates largely replicate private arrangements mothers have already in place, while longer mandates do lead to an increase in time at home.

If mandates can influence the time at home, how does this translate into better outcomes for babies? An obvious and widely cited channel is breastfeeding. While it is self evident that breastfeeding is challenging when mothers work outside the home, there are few estimates of the impact of maternity leave mandates on the incidence or duration of breastfeeding. Furthermore, almost all evidence is correlational. There is some consensus that the initiation of breastfeeding is independent of the decision to return to work (e.g., Dennis 2002). However, the duration of breastfeeding after initiation does appear to depend on work decisions.

Research on the duration of breastfeeding reveals three key findings. First, women who return to work (especially full time) breastfeed for less time than those who don't (e.g., Berger et al. 2005, Chatterji and Frick 2005, Fein and Roe 1998, Gielen et al. 1991, Kearney and Cronenwett 1991, Kurinij et al. 1989). Second, breastfeeding tends to terminate near or in the month of the return to work (e.g., Lindberg 1996). Finally, mothers report return to work as a reason for ending breastfeeding (e.g., Bick et al. 1998, Schwartz et al. 2002). Very few studies directly examine the relationship between the duration of breastfeeding and the duration of time spent at home post birth (e.g., Visness and Kennedy 1997, Roe et al. 1999), so that the size of the impact of a longer maternity leave mandate on breastfeeding duration is an open question.

Public health goals for breastfeeding are ambitious. The World Health Organization recommends exclusive breastfeeding for 6 months, and breast milk with complementary foods up to age two. Health Canada has adopted the WHO recommendation while the American Academy of Pediatrics counsels at least one year of breastfeeding, the first six months exclusively.¹ The reasons for these recommendations are varied and not uncontroversial. For some the benefits of breastfeeding are expansive and unequivocal (e.g., American Academy of Pediatrics 1997, Dennis 2002, Chatterji and Frick 2005) They include protection against diarrhea, asthma, otitis media, sudden infant death syndrome, insulin-dependent diabetes mellitus, Crohn's disease, lymphoma and leukemia as well as enhancing cognitive development and neurodevelopment. There are also benefits for mothers through decreased postpartum bleeding, more rapid uterine involution, an earlier return to pre-pregnant weight, delayed resumption of ovulation resulting in increased child spacing and possible reduced risks of ovarian cancer and breast cancer. Almost all this evidence is correlational, however, and others take a much more cautious and narrow position (e.g., Kramer 2001). Surveys of research preceding the WHO recommendation to increase exclusive breastfeeding from 4 to 6 months found compelling evidence only for a reduction in gastrointestinal infection in children and delayed menses and marginal post birth weight reduction for mothers (Health Canada 2004, Kramer and Kukama 2002). For our empirical work, we use this existing base of evidence to guide our selection of health indicators to study.

Other benefits of extended maternity leave mandates may flow directly from the extended parental care of infants. Ruhm (2000) and Tanaka (2005) report that longer maternity leave

¹ In 2002, U.S. breastfeeding rates at 6 months were 35% and 13% for partial and exclusive breastfeeding respectively (Ruowei 2005). For Canada, 2003 data for births in the previous 5 years reveals rates at 6 months of 39% and 19% respectively (Statistics Canada 2006). The US Happy People 2010 goal is an overall breastfeeding rate of 50% at 6 months.

entitlements are associated with lower infant mortality. The origin of this outcome is not identified, but may involve lower accident rates or better monitoring and maintenance (e.g., checkups and immunizations) of infant health when mothers are at home.

Alternatively, developmental and cognitive outcomes may improve with greater mother/infant interaction. In the economic literature the mechanism for this effect is not well articulated, but one possibility is that non parental care at young ages has detrimental effects. This is consistent with studies that report maternal employment in the first year of life can have adverse consequences. Attachment theory provides a more explicit intermediary: the security and continuity of parent/child relationships. The “Strange Situation” procedure provides a systematic classification of children’s attachment security. The consequence of insecure attachment for later outcomes is not empirically clear, however, as the field struggles with more rigorous theoretical predictions and control for confounding factors (e.g., Thompson and Raikes 2003).

A different argument comes from the emerging field of epigenetics. This field studies inheritable marks on genes that convey information such as which parent the gene came from, but also act as switches turning genes on and off. One line of investigation in the field is how environment can affect these switches, potentially triggering them to improperly turn genes on or off. A connection to infant development lies in the argument that maternal/parental care provides the optimal environment for those marks that play a role in the first years. For example, early social environment is thought to influence marks that affect serotonin function and thereby adult depression (e.g., Mustard 2006). Much of the current evidence appears to be animal based and application to humans is by analogy.

Maternity Leave and the Policy Environment in Canada

For most workers in Canada maternity leave provisions that provide a right to return to a pre birth job after a specified period of absence are found in provincial labor standards legislation. In this section we first describe the specifics of maternity leave mandates in Canada, followed by an inventory of other policy changes occurring contemporaneous with the maternity leave mandate change.

All provinces in Canada have maternity leave provisions. The provisions typically protect workers from dismissal due to pregnancy, specify that the leave is unpaid and its maximum duration, specify a minimum period of pre birth employment for eligibility, and finally specify which terms of employment are preserved during the leave and any responsibility of the employer to maintain benefits. Some workers are covered by federal labour standards (e.g., the federal public service, banking, transportation and communications), which contain maternity leave provisions which are similar in principle, if not in detail, to their provincial counterparts.

While the legal entitlement is to unpaid leave, since 1971 some workers have access to income support during maternity leave through the Employment (i.e., Unemployment) Insurance (EI) system. Workers who qualify and take a full leave can receive benefits that replace 50-55% of weekly wages up to a cap set to the average wage. The eligibility rules for EI maternity/parental benefits are not the same as for maternal leave entitlements under provincial labor laws, so a worker could qualify for one and not the other. Also, the EI rules do not provide a right of return to the pre-birth job. The proportion of new mothers who receive EI maternity/parental leave benefits is 40-50%.²

² In National Longitudinal Survey of Children and Youth (NLSCY) data for 1994-2002, roughly 40% of mothers with children aged 3-11 months reported EI income in the previous calendar year.

Over the past 30 years, changes in the duration of EI maternity/parental leave benefit entitlements have influenced provincial maternity leave mandates. This is true as well for the policy change that we examine. Effective December 31, 2000, the duration of EI benefits for maternity/parental leave were increased from 25 to 50 weeks. Correspondingly, the provinces changed labor standards legislation to provide longer leaves.

In table 1 we summarize maternity leave mandates in effect in the different provinces in 2000 and 2001. The first thing to notice is that the mandate in Quebec did not change over this period, as it was already 70 weeks prior to the EI change.³ Therefore, the policy change in this province is an increase in the proportion of leave that is eligible for income support rather than an increase in the length of leave. While this type of change holds interest in its own right, we omit the province of Quebec to maintain homogeneity in the treatment. Second, by 2001 the mandates in all the other provinces are at least one year with very little variation. There is some small variation in the date in which the increase in the leave comes into effect. Unfortunately the two provinces that delay to 2001 are too small for us to exploit this feature in our analysis. Third, there is some heterogeneity in the starting points in 2000, when leave mandates ranged from a low of 18 weeks in Alberta to a high of 35 weeks in Ontario. Finally, because all provinces save Quebec change their mandate more or less simultaneously, the policy change we seek to analyze is empirically coincident to a time effect starting in 2001. We explicitly address this challenge to the investigation in our empirical design.

Because all provinces changed their leave mandates simultaneously, it is important to account for other changes to the social and economic environments of families with young children over this period. Two specific developments stand out. First is the provision of heavily subsidized child care places (\$5/day) to children aged 0 and 1 in the province of Quebec in the

³ The mandate in Quebec rose from 52 to 70 weeks in March 1997.

fall of 2000. This was the last phase of the Quebec Family Plan that provided these subsidized places to all children aged 0-4 in steps over the period 1997-2000. Baker et al. (2005) report that this program had significant effects on the use of non parental care in Quebec as well as on the development of children in this province. This policy provides an additional reason to omit Quebec children and mothers from the current study.

The second development is changes to the federal child tax credit between 1998 and 2002. Baker et al. (2005) report the amounts of federal and provincial refundable tax credits available to two child families of different types and income levels over this period. The results show that the resources available to mid to high income two parent families changed very little as a result of these reforms. The credits available to two parent families with lower incomes, however, did gradually rise on the order of \$700 annually in total. The credits available to single parent families rose more dramatically especially at low income (up to \$2500 in total). The much larger impact on single parent families counsels omitting these mothers and their children from the analysis. The effect on low income two parent families potentially confounds our analysis; a problem we can explore by exploring heterogeneity in any effects by education or other determinants of income.

Data

We use data from the National Longitudinal Study of Children and Youth (NLSCY). The NLSCY is a national longitudinal survey that follows cohorts of Canadian children from birth. The survey is conducted bi-annually and currently the 1994-95, 1996-97, 1998-99, 2000-01 and 2002-03 waves are available. The sampling frame is the same as the Canadian Labour Force Survey, which excludes only residents of the three northern territories, institutions, the military, and Indian Reserves. In 1994-95 the target population for the first wave of the NLSCY

was children aged 0-11 in 1994. This cohort has been followed continuously across the following four waves. In addition, in waves 2 through 5 a new cohort of 0 and 1 year olds is added; these children are then followed longitudinally to age 5. This means that waves 1 through 4 provide a cross section snapshot of children aged 0 through the oldest age of the original cohort. In wave 5 a gap opens up at ages 6 and 7.

The NLSCY contains a rich array of information on children's development, health, parenting, non parental care, test scores and school performance. The information varies both in content and detail by age. For example, there is no cognitive information prior to age 4, and measures of anxiety are constructed differently by age group. This limits both the research questions that can be asked for children at certain ages, as well as the use of children of different ages as control groups.

Our focus is on children up to 29 months in age from the birth cohorts 1998 through 2002 who are living in families with two parents. These observations we extract come from wave 3, 4 and 5 of the survey. Given that 6 months of leave was available in almost all provinces prior to the reform, we exclude children aged 0-6 months in order to focus on the children experiencing the extension of leave. The only children aged 6 months or more who were born after the mandate extension comes from wave 5 (2002-03). In wave 5, children eligible for the new longer mandate are at most 29 months old. The data from waves 3 and 4 therefore contribute only untreated controls in the age range 7 to 29 months to our analysis.

The age structure of the NLSCY is explored in table 2. The table reports the minimum and maximum age in months for children of each birth year cohort in each of the three waves of data that we use. Because the survey is in the field from the Fall to the Spring, children born on the same day could potentially have different ages when surveyed even within the same wave.

For the 1998 birth year, we see children ages 2 to 18 months in wave 3, and then 45 to 63 months by wave 5. For the children born after the policy change, we observe them in wave 5 at ages 9 to 29 months (2001 birth year) and 4 to 17 months (2002 birth year). For wave 5, there is some slight overlap in ages for those born in 2000 and 2001: for ages 25 to 29 months we have both treated and untreated observations. Our empirical strategy described below exploits this overlap.

The focus on children in two parent families serves several purposes. First, it places attention on families who have larger financial resources and therefore, are more likely to take advantage of the longer leave mandate. Second, as explained above, it minimizes the influence of policy driven confounding factors such as the revision to federal child benefits. Third, while enhancing the homogeneity of the group studied, this restriction does not severely limit the representativeness of the analysis as births in two parent families represent close to 90% of all births over the period.

We then separate the children aged 7 through 29 months into three groups: a) ages 7-12 months, b) ages 13-24 months and c) ages 25-29 months. The first group isolates the infants that are being contemporaneously treated by the policy reform. These children may not have yet received the full impact of the reform, since it extended coverage to leaves of up to one year. The second and third groups allow us to look for any longer term effects of the treatment. The inference for children aged 25-29 may not be as sound, however, because we only observe one post-reform birth cohort (2001).

As noted above, we omit children from Quebec from the analysis. We also omit the small number of children born in Alberta and Saskatchewan in 2001 before the provincial labour law mandate was changed to conform to the change in EI rules. We suspect that some firms in this province may have granted these children's mothers longer leaves when the EI rules changed

in anticipation of the change in the provincial law. Finally, we omit cases where the mother is not the “person most knowledgeable” (i.e., the respondent) about the child. This final restriction is to limit the heterogeneity in any response bias. This restriction together with our focus on two parent families yields 75% of all possible observations in each age group. Of the missing 25 percent, roughly 15 percentage points of the loss is due to the requirement that mothers be the PMK and 10 percentage points due to the restriction to two parent families.

For the analysis of breastfeeding we use data from the second cycle of the Canadian Community Health Survey (CCHS). This cycle of the CCHS is a retrospective survey conducted between January and December 2003. The target population is individuals aged 12 or older. Females who have given birth in the preceding five years are asked a series of questions about their breastfeeding practices. We use the data for women who had a child in the years 1998-2001, and again focus on mothers in two parent families.⁴ While the accuracy of the information from the survey may be affected by recall bias, the questions are quite detailed relative to the breastfeeding information collected in the NLSCY. More importantly, survey difficulties in the fifth wave renders the NLSCY data on breastfeeding unreliable for children born in the 2001 and 2002 birth cohorts. Nevertheless, we refer in footnotes to some selected results from the NLSCY data for comparison.

We study a variety of outcomes using both the CCHS and the NLSCY. The outcomes we investigate vary somewhat by age group. This is because either their interest is age specific, or because they are not available for all age groups.⁵ The outcomes can be divided into three

⁴ We also drop observations from Quebec. We unable to drop observations from Alberta and Saskatchewan in 2001 before the provincial labour law mandate was changed because month of birth is not provided. In regressions using mandated months of leave as an explanatory variable we use a calendar weighted average of the mandate for these provinces in 2001.

⁵ Two other problems are 1) the 25-29 month age group is in their second wave of the survey and some information collected in previous waves is imperfectly brought forward, and 2) recall bias will more severely affect the responses about early infant outcomes (e.g., milestones) from mothers of older children.

groups; each is described below.

One set of variables measure direct changes in infants' environment and care as a result of the policy change. It includes how long the mother stayed at home post-birth, mothers' employment and work characteristics post birth, the type and amount of any non-parental care the child received, parenting practices and family functioning, and the duration of breastfeeding, including a measure of exclusive breastfeeding.

Another set of variables cover some health outcomes of the child and mother. A fairly complete birth report is available including birth weight and length, gestation, complications of the delivery and post natal complications. Measures of the current health of the child include height and weight, diagnoses of conditions such as asthma and bronchitis, injuries, the experience of nose and ear infections and overall self (parent) reported health indices. For mothers' current health we have self reported health, a depression index, and a record of post partum depression and complications.

A final set of variables cover the emotional, motor and social development of the child. For social and motor development we have an aggregate index, as well as responses to the individual questions on which it is based. There are also a series of questions that capture the age at which milestones, such as first steps, are achieved. For emotions there is no aggregate index, only answers to individual questions about security and temperament.

Empirical Framework

A challenge to the empirical analysis is that the change in maternity leave mandates in 2001 was national and almost simultaneous. This means that in a direct analysis of the reform any effect will be observationally equivalent to a year effect. Consider the estimating equation

$$(1) \quad y_{iw} = X_{iw}\beta + \sum_t \gamma^t YOBt_{iw} + \varepsilon_{iw}$$

where y is the outcome of child i in wave w , X are a set of control variables and $YOBt$ is a year of birth indicator. A child is treated if $YOBt \geq 2001$. Because the interval of children's ages is the same for each birth cohort in each sample, the YOB indicators are perfectly co-linear with a set of year indicators, or more properly wave indicators for the wave of the survey in which the outcome is measured for children in a given birth cohort. Therefore, the γ^i 's for the years of birth 2001 and later capture an effect of the change in maternity leave mandates on the outcome only if there are no other changes over time (e.g., wave effects) on other determinants of the dependent variable.

We adopt a number of approaches to this challenge. First, we estimate equation (1) with a full set of $YOBt$ effects and test for the equality of the estimates before and after the change in policy. In cases where the restrictions are not rejected, and the estimates of the γ_i 's appear numerically similar, we directly estimate the effect of the policy reform by replacing the YOB indicators with the dummy variable $POST$, which equals 1 if $YOB \geq 2001$, and 0 otherwise. Figures 1 and 2 demonstrate some strengths and weaknesses of this approach. In figure 1 we graph the individual estimates of the year of birth effects (taken from the appendix) for the dependent variable "child's' age in months when the mother returned to work" using the age 13-24 month old sample. The omitted birth cohort is 1998, and the horizontal lines above and below the 0 line indicate the average standard error of the estimates.

Clear in Figure 1 is a distinct and dramatic change in the estimates starting with the 2001 cohort. This cohort is the first eligible for the longer leaves. In this case we proceed with some confidence substituting the $POST$ variable for the $YOBt$'s to obtain an estimate of the average change between the 1998-2000 and 2001-2002 cohorts. In figure 2 we present similar information for a 0/1 indicator that the child's mother has returned to work using the age 25-29

sample. In this case we obtain a statistically significant (and negative) estimate of *POST*. This graph reveals, however, significant variability in the *YOB_t*, so that a causal interpretation would be erroneous. In still other cases the estimates of *YOB_t* swing significantly year to year.

Second, for the 25-29 month age group we exploit the fact that the outcomes of both treated (*YOB*=2001) and untreated (*YOB*=2000) children were measured in the same wave of the survey (wave 5). While these children were, of course, the same age in the same wave of the survey and not at the exact same point in time, this estimator can be viewed as identifying an effect off of children born just before and after the change in policy, and controlling for any systematic survey wave effect on measurement.

Third, for children aged 13-24 months we use the fact that some outcomes are measured for older children (aged 25-33) to construct a group of untreated children in each wave of the data.⁶ This allows us to estimate a difference-in-difference equation which controls for any survey wave effects on outcomes. The equation estimated is

$$(2) \quad y_{iw} = X_{iw}\beta + \alpha YNG_{iw} + \sum_w \lambda^w WAVE_w + \eta YNG_{1w} WAVE5 + \varepsilon_{iw}$$

where $YNG_{iw}=1$ if the observation is for a child aged 13-24 months, and *WAVE5* is an indicator of an observation from wave 5 of the data, the only wave in which children aged 13-24 months were exposed to the longer maternity leave mandate.

None of these approaches addresses all possible biases, but consistency across the different estimators gives us greater confidence we are capturing a causal effect. While the reform we analyze falls short of a fully randomized experiment, our empirical strategy does offer a distinct advance on the purely correlational inferences used in many previous studies.

⁶ We cannot construct this estimator for the 6-12 month age group as all children of these ages are treated in the 5th wave of data. Because there are sharp changes in the outcomes available in the NLSCY starting at age 3 years, this strategy is ineffective for children aged 25-29 months because the NLSCY reports a different set of outcomes for the natural comparison group that is a bit older than the 25-29 month olds in wave 5.

The control variables in the base specification include dummy variables for males, single month of child's age, province, city size, mothers' and fathers' education (4 categories), age (6 categories) and immigrant status, and the presence of up to 2 older or younger siblings.⁷ We also explore the sensitivity of the estimates with a specification that adds the year of birth and month of interview provincial unemployment rates as controls.⁸

Time at home Post Work

Any benefits of longer maternity leave mandates are predicated on mothers staying at home longer post birth. Baker and Milligan (2005) analyze the impact of the 2000 maternity leave extensions on the decision to work post birth. They report significant changes in the proportions of mothers with a child aged less than one who were employed and on leave (up by over 33%) and employed and at work (down by over 33%) as a result of this reform. This suggests that this policy led mothers to spend substantially more time at home post birth.

Our NLSCY data allow us to refine this inference by directly estimating the number of additional months mothers stayed at home. Each mother is asked the age of her child in months when she returned to work. We therefore can construct measures of the incidence of return to work, the point in time post birth a return takes place and other characteristics of this employment.

Estimates of equation (1) for measures of post birth work for our various samples are presented in table 3. The estimates for children aged 7-12 months are in the first panel. There is a large significant reduction in the proportion of mothers of these children who have returned to work of almost 30 percentage points, which is 54% of the pre-reform baseline rate of 0.55. The

⁷ For the CCHS regressions the control variables are dummy variables for province, city residence, mothers' education (4 categories), age (single year) and immigrant status. The other controls are not available in the CCHS.

⁸ Because interviews also spanned several months, we randomly assigned unemployment rates from months in which a specific age group was interviewed. Year of birth unemployment rates will be replaced with month of birth rates in a future draft.

estimates of the individual *YOBt* effects, reported in the appendix, show that, conditional on the control variables, there is a discrete shift downward in the proportion employed, starting with the 2001 birth cohort. There is a much smaller, but significant impact on the proportion currently employed. In this case employed includes both those currently at work and those on leave from a job. The inference is that post reform more mothers terminated their jobs to give birth. The appendix table shows this effect was particularly strong for the 2001 birth cohort. The final two variables measure characteristics—hours and continuity—of any employment post birth. These estimates do not indicate any effect of the change in policy. In the last column of the table we report estimates of *POST* adding both year of birth and wave of interview unemployment rates as additional controls. All results are robust to this innovation.

In the next panel are results for children aged 13-24 months. Because the maximum leave duration is 12 months post reform, this age range is nominally not affected by the mandate extension. That said, the first row indicates a modest reduction in the proportion of mothers who have returned to work of almost 6 percentage points. The next row shows that this reduction is not due to some individuals on very long maternity leaves as there is an almost 5 percentage point reduction in the proportion currently employed (i.e., at work or on leave). In both these case there is some variability in the estimates of the individual *YOBt* effects (see the appendix) suggesting these estimates may overstate any reduction in employment. The third row indicates an almost 9 percentage point reduction in the proportion of mothers who had returned to work after 12 months—the length of the post 2000 maternity/parental leave mandates.

In the next three rows we examine the employment of mothers who have returned to work. The key result is the 3.4 month increase in the amount of time these mothers stayed at home before returning, a 54% increase over the baseline rate. This is the basis for any effects on

the breastfeeding, health and development of their children. If we replace the POST dummy variable with a variable representing the leave entitlement by province, by year, at the time of birth, we can calculate an elasticity of time at home with respect to the leave mandate for these mothers. The estimate of the parameter on the leave variables is 0.141 (0.026),⁹ which at sample means implies an elasticity of 0.724. Together with a perhaps modest reduction in the proportion of mothers returning to work, this result indicates a significant increase in parental care primarily at age 7-12 months.¹⁰ Also, the estimates again show no significant effect on average hours or continuity of work post birth, and all estimates are robust to adding year of birth and wave unemployment rates as additional controls.

The final panel contains the results for children aged 25-29 months. While some of the estimates indicate both statistically and economically significant changes in dimensions of work, in almost all cases the variability in the individual year of birth effects (appendix) is large and a causal inference would be aggressive. The one exception is the estimated impact on the age the mother returned to work. At 3.4 months, it is almost an exact match to the estimate obtained from the sample of 13-24 month olds. The implied elasticity at sample means is 0.694.¹¹

Non Parental Care

Investigating changes in non parental care with the change in maternity leave mandates provides a simple consistency test of our employment results. More importantly, it also provides insight to changes in the care environments of infants when mothers are at home. The NLSCY provides a rich set of variables capturing the various types of non parental care families can access.

⁹ Standard errors, calculated clustering at the province/year level, in parentheses.

¹⁰ Selecting the sample of mothers who returned within one year the increase in the child's age at the mother's return to work is 3.167 months with a standard error of 0.211.

¹¹ The estimated parameter on leave mandate duration is 0.158 (0.018).

In the first panel of table 4 are the results for children aged 7-12 months. There is a large, significant 17 percentage point reduction in the proportion of these children in non parental care which is 41% of the pre-reform mean. The estimates of the individual *YOBt* effects in the appendix suggest this change is a result of the policy reform. Note that this decrease is only (17/29) 59 % of the reduction in employment of these mothers. This could happen because some mothers taking longer maternity leave still used non parental care, or the childcare question is erroneously picking up programs attended by the mother and child, or missing the use of very informal non-parental care.¹²

To explore this puzzle we split the mothers into four groups: working with care, working without care, not working with care and not working without care. Separate regressions for each of these categories (not reported) reveal 23 of the 29 percentage point reduction in mothers who have returned to work is in the category ‘working with care’, while the remainder is in the category ‘working without care’. The reason we do not see a 23 point decrease in the use of non-parental care, however, is due to a 5-6 point increase in the proportion not working and using care. Therefore, the translation of the effect of the drop in employment to the *reported* use of non-parental care is moderated by both the use of care in the absence of work and work without care, which may simply reflect the underreporting of care in the survey.

The next rows reveal a fall in hours conditional on being in care and a greater than 50% reduction in unlicensed care in someone else’s home. The latter is likely babysitters or family childcare providers working out of their homes. While some parents may prefer this type of care, the quality of unlicensed care may have higher variance.

¹² The gateway question to the childcare section of the survey asks “Do you currently use childcare such as daycare, babysitting, care by a relative or other caregiver, or a nursery school while you (and your spouse/partner) are at work or studying?” If the answer to this question is no, then the rest of the childcare section is skipped. It may be that some respondents who use more informal types of care answer ‘no’ to this gateway question.

In the following panels the results for older children reveal if any of these results persist. For children aged 13-24 months all the estimates are small and statistically insignificant, indicating no deviation from the pre-reform status quo. This inference is reinforced by the estimates of the individual *YOBI*'s reported in the appendix, which do not indicate any discrete change in any variable starting with the 2001 cohort. For ages 25-29 months there are some larger, and for the 'care at home' results, significant estimates, but a review of the individual year of birth estimates in the appendix suggests these are not systematic effects of the policy reform. These results provide an additional reason to interpret the estimates in table 3, which indicated a modest reduction in the employment of the mothers of these children, with caution.

Breastfeeding

Longer maternity leave may significantly extend the period infants are breastfed. This is important because breastfeeding rates significantly lag public policy goals. In the US the proportion of children breastfed in the early post partum period is close to 70%, which is just shy of the Happy People goal of 75%.¹³ But the rate at 6 months of age is just one-third, and at one year under 20%, which are below the Happy People targets of 50% and 25% respectively. Exclusive breastfeeding (2002) is much lower at 43% at 3 months and 13% at 6 months, well below WHO recommendations. Rates in Canada prior to the extension of leave considered here are quite similar. In 1997 about 73% of mothers initiated breastfeeding and 31% of infants were breastfed 6 months or longer.¹⁴

The reason to expect longer maternity leaves to increase these rates is that work is a leading reason to stop breastfeeding. In our CCHS data "return to work or school" is the third most common reason to end breastfeeding after "not enough milk" and "child weaned him/her

¹³ US breastfeeding rates are from Centers for Disease Control (2006) and cover the period 1998-2003.

¹⁴ These rates are from Health Canada (1998) as cited in Chalmers and Wen (2004).

self”. Similarly in the US, a survey conducted by breastfeeding product company Lansinoh Laboratories and released in 2005 reveals work related issues and return to work were major reasons for stopping after “not enough milk” and “problems latching” (non mutually exclusive categories).¹⁵ Also in the UK (Hamlyn et al 2002), return to work or college is a leading reason to stop breastfeeding. The UK data are revealing because the reasons are reported by duration of completed breastfeeding. Return to work grows in importance starting at 6 weeks, and is the top reason after 4 months (non mutually exclusive categories).

In table 5 are estimates of the effect of longer leaves on breastfeeding from the CCHS data. The first row reveals little effect on the incidence of breastfeeding. Because the CCHS data are retrospective from a point in time (2003), children from more recent birth cohorts are more likely to be still breastfed. We only use birth cohorts 1998-2001, and for the analysis of duration we focus on children breastfed one year or less. From the data available we can determine whether the children in each of these birth cohorts have been breastfed this long.¹⁶ The second row reveals a modest drop in the proportion of children who satisfy our sample selection criteria with the extension of leave. This indicates that a small part of the effect of the mandate on breastfeeding duration occurs outside our sample window, which both before and after the reform contains the vast majority of mothers.

In the next row we report the effect on completed duration, conditional on it being one year or less. It rises by almost 2.3 weeks, which is almost 12% of the pre-reform mean of just over 4.5 months. Again, replacing the POST dummy variable with leave entitlement by province/year permits calculation of an elasticity of breastfeeding duration with respect to the

¹⁵ Survey results accessed at <http://www.corporatenews.net/cgi-bin/pc201v3.php?source=pc200v3.php&pr=11&pccl=24610> on June 6, 2006.

¹⁶ Breastfeeding duration in the CCHS is recorded in discrete categories. A continuous measure is constructed by coding each category at its midpoint duration. This restriction to breastfeeding one year or less gets around having to code the final open ended category “more than 1 year”.

leave mandate. The estimated parameter on the leave variable is 0.099 (0.031). At the sample means this implies an elasticity of 0.178.¹⁷ This inelastic response reflects the fact that the leave mandate rose about 20 weeks on average while breastfeeding duration rose by just over 2 weeks. We could instead calculate the elasticity with respect to the 100% increase in the duration of EI maternity leave benefits. In this case the elasticity is just the percentage change in breastfeeding duration which is 0.110 at the sample mean.

The next 4 rows break down the effect for specific time periods. The results indicate that much of the effect is extension of breastfeeding beyond six months. The estimate for duration of at least one month is also large but the appendix tables reveal considerable year to year variation in this proportion casting some doubt on the one month result.

In the next row is the effect on exclusive breastfeeding.¹⁸ The estimate is almost 1.5 weeks. Again we can estimate an elasticity using the estimated parameter on the variable for leave entitlement (0.068 (0.016)). At the sample means, the elasticity is 0.198. The appendix table reveals more volatility in the *YOB_t* estimates before the policy reform so this inference is not as strong as for total duration. The final two rows investigate how work effects the introduction of food and the cessation of breastfeeding. While the estimates indicate some effect, the appendix table again suggests caution interpreting these results.¹⁹

Health

We now examine the impact of leave on broader measures of health. Longer periods of parental care in infancy may have both direct and indirect effects on children's health. The

¹⁷ The estimated increase in duration (conditional on one year of less) from the NLSCY data is 2.51 weeks. The estimated parameter on leave duration is 0.088 (0.034) which implies an elasticity at sample means of 0.162.

¹⁸ The variable is constructed from a measure of the age at which any other liquids or solids were added to the child's feed. Consistency with the breastfeeding variable was required (age at which other foods introduced \leq age at which breastfeeding ended).

¹⁹ The estimated reduction in the proportion reporting they stopped breastfeeding due to work in the NLSCY data is 7.5 percentage points. In these data the individual year of birth effects are more stable.

relationship between maternity leave and child mortality in the post neonatal period (e.g., Ruhm 1998) may result from either better accident prevention or better monitoring of children's health. As noted above, many health effects are attributed to a longer period of breastfeeding. Longer maternity leave may also lead to better maternal health, for example reducing post partum complications or depression.

In table 6 are estimates of effects on mothers' and infants health. In the first panel are the results for 7-12 month olds. The estimates for both mothers' depression (a 36 point scale, higher values representing more depression) and mothers' (self reported) health (a 5 point scale, 1=excellent, 5=poor) are statistically insignificant, and the volatility of the *YOB_t* estimates (in the appendix) dominate any effect of the policy change. The NLSCY also has variables for mother's post partum depression and number of post partum "problems", but each is missing for some pre-reform cohorts compromising the control for pre-reform trends. Nevertheless, the estimates (not reported) for both variables are very small and statistically insignificant, and the estimates of the individual year of birth effects do not suggest a causal effect of the policy change.

In contrast there does appear to be a positive effect on a 0/1 indicator that the child's health is excellent, and the estimates of the individual year of birth effects are consistent with this interpretation. The estimate for the child's current weight (including a conditioning variable for the child's birthweight) is insignificant, a result that is of interest due to concerns that longer periods of exclusive breastfeeding might compromise infant growth. Also insignificant is the estimate for a 0/1 indicator whether the child was injured in the last year. There is a negative effect on the incidence of ear infections, but again the year effects for this regression are volatile.²⁰ Finally, as a summary of more serious illness, we report an estimate for the incidence

²⁰ Similar inference (not reported) is obtained for the number of injuries and the number of ear infections.

of chronic conditions.²¹ It indicates a significant reduction in chronic conditions and the individual *YOBt* estimates suggest that it's causal. In the last column of the table we report the results when we add the wave unemployment rate to the conditioning variables. In each case the inference is robust to this innovation.

These results indicate that longer maternity leaves have modest effects over the age period in which the increase in maternal care is experienced. While the dependent variables reported were chosen on the guidance of previous research, a broader group of outcomes including infants' nose infections, allergies, asthma and bronchitis were investigated. In each case the estimates do not indicate an effect of longer leave/breastfeeding duration on health. Additionally, the inference is that extended maternity leaves had no effect on outcomes such as period of gestation, the incidence of C-sections and birth height and weight.

In the next panel are results for 13-24 month olds. Compared to the results for younger children, we see significant reductions in mothers' depression, the incidence of ear infections and the incidence of asthma. In each case the estimates of *YOBt* reported in the appendix support a causal interpretation, and the estimates are similar conditioning on the wave unemployment rate. The result for asthma is particularly intriguing because previous research has argued longer periods of breastfeeding reduce the incidence of this ailment. Gone, however, is the significant increase in the child's overall health seen at the earlier age and the reduction in chronic conditions. Finally, the inference of no effect on child's weight finds further support in this age group.

For the age group 13-24 month there is another identification strategy that adds older untreated children in each wave of data as an additional control. These untreated children would

²¹ These conditions include allergies, bronchitis, heart conditions, epilepsy, cerebral palsy, kidney condition, mental handicap, learning disability, attention deficit disorder, emotional, psychological or nervous difficulties, and a open category "other".

help control, for example, for a secular decline in ear infections after 2000, coincident with the policy reform. Estimates of equation (2) using children aged 25-33 months of age as a control group are reported in table 7. The interaction of the *YNG* and *WAVE5* dummy variables indicate any additional effect for the treated 13-24 month olds. The impacts on mother's depression and ear infections identified in table 6 appear to be the result of a wave effect that also affected older children who did not experience longer leaves. The effect on the incidence of asthma remains, but the standard error is larger so it is no longer statistically significant. Estimates of this model for other unreported outcomes reinforce the conclusion of few important effects of longer maternity leave and/or duration of breastfeeding on NLSCY measures of infant and mothers' health.

In the last panel of table 6 are the results for 25-29 month olds. Here the estimates are largely consistent with the results for the younger age groups. Notable is that the negative effect on the incidence of chronic conditions is evident again. The negative estimate for the incidence of asthma is similar to the one in the previous panel, but the standard error is much larger. It is important to note that in these estimates wave effects are effectively controlled for as observations on both the 2000 and 2001 birth cohorts are taken from wave 5.

We have replicated this analysis for ages 13-24 and 25-29 selecting children whose mothers returned to work in their first year of life. This sample better isolates those directly affected by the reform, although it may be affected by selection because we find some evidence that return to work in this period declined modestly with the extension of leave. The estimates from this sample are very similar to those reported, with the exception that the inference for the incidence of asthma is slightly stronger: similar or larger point estimates and smaller standard errors.

The analysis of health has uncovered few effects of longer parental care/breastfeeding on the measures of health available in the NLSCY. A “positive” result is no evidence that longer periods of exclusive and any breastfeeding compromise infant growth as measured by weight. That said, our estimates of the increase in the duration of breastfeeding are quite modest. There is also weaker evidence of a contemporaneous effect of increased parental care/breastfeeding on overall infant health and a persistent effect on the incidence of chronic conditions and perhaps asthma. It could be that there are other benefits but they result from initial rather than extended periods of breastfeeding and/or manifest at older ages. Also, we have no measure of gastrointestinal problems one of the more widely acknowledged benefits of breastfeeding. Nevertheless, it is significant that we find no effects on the incidence of ear infections or allergies.

Development and Environment

Previous studies have revealed longer term effects of early maternal employment on cognitive abilities. Given the ages of children in our sample, we are not able to investigate their cognitive development with the waves of the survey currently available. The NLSCY does, however, provide a wide array of behavioural measures that allow us to investigate temperament, motor control and pre cursors to more comprehensive cognitive measures such as the ability to count or to speak simple phrases. These measures also provide information on the infants’ exposure to organized children’s programs and activities such as stories, singing and walks.

In table 8 we present the estimates for children aged 7-12 months. In the first three rows are measures of parenting styles and the overall family environment. The strongest result here is an increase in positive parenting. This measure is built up from a series of questions about the interaction between parent and child. The positive contemporaneous association between

parental care and positive parenting is consistent with other research using NLSCY data that shows a negative association between good parenting practices and the use of non parental care (Baker et al. 2005).

The next four variables measure various dimensions of the child's temperament and ability to adapt to new situations. In each case the variable is a 5 point scale with higher values indicating less desirable behaviour. While the results suggest that increased parental care leads infants to experience more upset to change and more frequent mood changes, the estimates of *YOBt* in the appendix show that this is a result of fairly regular cohort to cohort variation in these measures rather than a systematic effect of the reform. Furthermore, neither of these results is robust to the addition of the wave unemployment rate as a conditioning variable. A much wider array of these variables was investigated, including measures of reactions to new places, routines, and persons, and how easily and often the child got upset. Consistent with the reported results there is little evidence of a contemporaneous effect of increased parental care on these measures.

The NLSCY records the age at which developmental milestones are achieved. The two that are appropriate for this age interval are reported in the next two rows.²² The age these children first feed themselves is estimated to drop by 8/10's of a month off a pre-reform base of 8.25 months. The age for first words drops by 6/10's of a month of a pre-reform base of 8.3 months. While the estimates of the *YOBt* effects in the appendix display some volatility, the general pattern suggests a causal effect of the policy change and this inference is strengthened by the results for the 13-24 month olds below. Therefore, parental care accelerates these two markers of motor and cognitive development.

The next three variables are measures of activities the child participates in. The reading

²² The other milestones recorded are sitting up, first solid food and first words.

and singing variables are measured on a 5 point scale with higher values indicating higher frequency. There is no evidence of an increase in the frequency the child is read to, but a significant reduction in the exposure to singing after the reform, which suggests that whatever type of care the children received before the reform encouraged more singing. There is also a significant increase of almost 8 percentage points in a 0/1 indicator of participation in parent/child groups, as there is for other organized activities such as drop-in centres and playgroups (results not reported). Therefore, the drop in non parental care shown in table 4 does not imply a reduction in organized activity.

The NLSCY offers an index of motor/social development built up from a battery of questions about the child's capabilities. In the next row is the estimate for this index, which indicates no systematic change as a result of the reform. Of course, the index could mask offsetting changes as increased parental care might promote those skills best learned through one-on-one interaction, but impede those gained through exposure to larger social environments. However, separate estimates for the individual questions reveal that there is no systematic effect of the policy change on any of these dimensions of development.

In table 9 are the results for the 13-24 month old group. The first row reveals an increase in positive parenting. This could either be a persistent effect of the strong increase in parental care at 7-12 months, or a result of the modest decrease in maternal employment for this age group. While a reduction in family function is also indicated, the estimates of the year of birth effects in the appendix suggest this is not a result of the policy change, and the result is not robust to the addition of the wave unemployment rate.

The next rows display improvements in the various measures of temperament, including a measure of how the child reacts to new persons which may be correlated with the security of

their attachment. With the exception of upset to changes in routine, however, the estimates of the individual year of birth effects for these variables do not strongly support a causal interpretation, and each of the effects is rendered statistically insignificant with the addition of the wave unemployment rate.

The results for the two milestones reinforce the inference from the 7-12 month sample. There are significant reductions in the age the child first feeds him/her self and the age for first words. While the absolute effects are somewhat larger than for the 7-12 month olds, the proportionate effects are quite similar.²³ In the next rows we see the persistence in the reduction in exposure to singing, no effect on being read to, and a much weaker effect on parent/child activities.²⁴ Finally, the last row shows no effect on the index of motor/social development. Again there is no evidence of a significant effect of the longer leaves on the measures underlying the index (not reported).

Difference-in-difference estimates of the measures of current behaviour are reported in table 10 for variables that are collected for both 13-24 month olds and 25-33 month olds.²⁵ The results mostly support the inference of table 9. Exceptions are the significant reduction in mood changes, more positive reaction to new persons and a marginally significant reduction in being read to.

Finally, in table 11 are the estimates for children aged 25-29 months. Here we see the increase in positive parenting consistent with the results for the other age groups, although the effect is at the margin of statistical significance. If anything, the temperament results indicate less desirable

²³ This might be expected. In results not reported the policy change also has a significant negative effect on the proportion in these age groups who have not achieved these milestones. At older ages more children achieve the milestone and are added to the calculation of the mean, but this effect will be larger for the pre reform period.

²⁴ The estimate for playgroups (not reported) is of similar magnitude to the estimate for 7-12 month olds.

²⁵ Estimates of the parenting measures are not possible because they are different for children whose “survey age” is 25+ months. Some mothers of children aged 25+ months are asked the younger parenting questions, but in wave 5 they are all eligible for longer maternity leave and therefore are not a legitimate control group.

behaviour, although the appendix reveals a fair bit of volatility in the year of birth effects. Again the estimate for the motor/social development index is insignificant, but this time there are some significant results for some of the individual questions underlying it. The three statistically significant estimates are reported in the following rows and each indicates a higher ability post reform. Furthermore, the individual year of birth effects are consistent with a causal interpretation. It's not clear, however, why increased parental care before age one would affect toilet habits. The increased ability to count may be a precursor to higher cognitive ability. We have again replicated this analysis for children whose mothers return to work within their first year of life. The point estimates and inference are very similar to the reported results.

Conclusions

In this paper, we explore the causal impact of extended maternity leave mandates on the health and development of children and their mothers. We have both a compelling policy episode and detailed data on health and development. While the strength of the causal inferences varies across the outcomes we study, our work presents a marked improvement on the purely correlational inferences in most existing studies.

Overall, our findings are mixed. We estimate a substantial impact on time at home, but only limited impact on breast feeding and measures of infant health. On child development, we estimate a strong impact on the age at which milestones such as feeding and speaking are reached, as well as some indicators of a positive parental environment, but do not find strong evidence for persistent impact of other measures such as motor-social development.

The findings are limited in several important ways. First, we study only two-parent families. Single-parent families may respond differently to extended leaves. Second, our results can only be applied to a mandate extension from 6 to 12 months and may not be informative for

shorter leaves. In particular, the health impact of an expansion from 6 to 12 months of leave on breast-feeding may be different from the impact of the introduction of a short leave which might induce breastfeeding initiation. Finally, we are not yet able to study the longer-run impact of the leave expansion on important indicators such as cognitive development. We anticipate studying these outcomes as data become available.

With those caveats in mind, our findings have important implications. In the context of existing research, other researchers have investigated links between leave mandates and outcomes such as infant mortality. In the data we study, we find few intermediate indicators that would link maternity leave mandates to large changes in future health outcomes. For policy makers, our estimates indicate that an extension of mandates will have a substantial impact in time at home, but a smaller impact on breastfeeding. If expanded durations for breastfeeding is a policy goal, maternity leave mandates alone may not be sufficient to attain that goal.

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Table 1: Dates of the Introduction of Mandated Parental Leave by Province

	Extension of Parental Leave Starting in 2000		
	Weeks of Leave in 2000	Date of Extension	Total Weeks of Mandated Leave Post Reform
Alberta	18	February 7, 2001.	52
British Columbia	30	December 31, 2000.	52
Manitoba	34	December 31, 2000.	54
New Brunswick	29	December 31, 2000.	54
Newfoundland	29	December 31, 2000.	52
Nova Scotia	34	December 31, 2000.	52
Ontario	35	December 31, 2000.	52
Prince Edward Island	34	December 31, 2000.	52
Quebec	70	N.A.	70
Saskatchewan	30	June 14, 2001.	52
Federal	41	December 31, 2000	54
EI	25	December 31, 2000.	50

Notes: Sources are provincial statutes and Labor Canada (Various Issues).

Table 2: Age structure in the NLSCY

		Wave 3: 1998-99	Wave 4: 2000-01	Wave 5: 2002-03
1998	min	2	25	45
	max	4	43	63
1999	min	2	9	37
	max	16	31	46
2000	min		0	25
	max		19	33
2001	min			9
	max			29
2002	min			4
	max			17

Notes: Reported are the minimum and maximum ages in months for each birth cohort in the NLSCY.

Table 3: Estimated impact of longer maternity leave mandates on mothers' labour supply in the NLSCY

	Pre-reform Mean	POST	P-value 1999=0, 2000=0	P-value 2001=2002	Obs.	POST with Unemployment Control
7-12 months						
Mother has returned to work	0.55	-0.295 (0.029)	0.12	0.14	1799	-0.305 (0.029)
Mother currently employed	0.60	-0.085 (0.035)	0.69	0.373	1803	-0.081 (0.031)
Hours when returned to work	25.82	1.032 (1.493)	0.42	0.64	860	0.753 (1.493)
Continuous work since return	0.86	0.042 (0.035)	0.50	0.085	860	0.041 (0.338)
13-24 months						
Mother has returned to work	0.63	-0.058 (0.025)	0.42	0.78	2948	-0.073 (0.027)
Mother currently employed	0.63	-0.046 (0.025)	0.48	0.88	2969	-0.061 (0.026)
Mother returned in 12 months	0.61	-0.088 (0.026)	0.67	0.81	2948	-0.087 (0.027)
Child's age at return to work	6.32	3.398 (0.220)	0.19	0.30	1892	3.078 (0.219)
Hours when returned to work	30.65	1.763 (0.750)	0.25	0.27	1901	1.601 (0.796)
Continuous work since return	0.84	0.029 (0.022)	0.54	0.31	1901	0.025 (0.021)
25-29 months						
Mother has returned to work	0.72	-0.112 (0.055)	0.00	NA	1361	-0.113 (0.055)
Mother currently employed	0.63	-0.059 (0.054)	0.01	NA	1385	-0.071 (0.055)
Mother returned in 12 months	0.65	-0.113 (0.055)	0.00	NA	1361	-0.112 (0.056)
Child's age at return to work	7.18	3.360 (0.620)	0.01	NA	1009	3.279 (0.624)
Hours when returned to work	30.52	1.153 (1.972)	0.03	NA	787	-0.056 (1.971)
Continuous work since return	0.76	-0.032 (0.061)	0.04	NA	787	0.025 (0.067)

Notes Standard errors in parentheses. NA=not applicable, Obs=# of observations. p-values are for the indicated restrictions on individual year of birth dummy variables.

Table 4: Estimated impact of longer maternity leave mandates on use of non-parental care in the NLSCY

	Pre- Reform Mean	POST	P-value 1999=0, 2000=0	P-value 2001=2002	Obs.
7-12 months					
In care	0.41	-0.174 (0.029)	0.29	0.96	1808
Hours if in care	28.51	-6.629 (1.807)	0.87	0.69	685
Care in centre	0.03	-0.010 (0.009)	0.15	0.91	1808
Care at own home	0.12	-0.035 (0.020)	0.71	0.52	1808
Care at other's home	0.26	-0.129 (0.025)	0.81	0.41	1808
Care in other's home unlicensed	0.22	-0.118 (0.023)	0.82	0.42	1808
13-24 months					
In care	0.47	-0.015 (0.026)	0.60	0.14	2960
Hours if in Care	29.1	0.549 (1.098)	0.66	0.14	1512
Care in centre	0.06	0.009 (0.014)	0.17	0.40	2960
Care at own home	0.15	-0.025 (0.019)	0.42	0.59	2960
Care at other's home	0.26	0.034 (0.023)	0.41	0.13	2960
25-29 months					
In care	0.48	-0.052 (0.053)	0.05	NA	1393
Hours if in Care	27.8	1.374 (1.945)	0.27	NA	713
Care in centre	0.08	0.017 (0.035)	0.04	NA	1393
Care at own home	0.14	-0.117 (0.028)	0.03	NA	1393
Care at other's Home	0.25	0.049 (0.046)	0.67	NA	1393

Notes Standard errors in parentheses. NA=not applicable, Obs=# of observations. p-values are for the indicated restrictions on individual year of birth dummy variables.

Table 5: Estimated impact of longer maternity leave mandates on breastfeeding in the CCHS

	Pre- Reform Mean	POST	P-value 1999=0, 2000=0	Obs.
Incidence	0.86	0.008 (0.018)	0.040	2988
One year or less	0.87	-0.042 (0.020)	0.58	2992
Duration if one year or less	19.94	2.273 (1.009)	0.86	2604
Duration > one month	0.66	0.053 (0.024)	0.22	2604
Duration > three months	0.49	0.034 (0.029)	0.68	2604
Duration > six months	0.25	0.063 (0.026)	0.37	2604
Duration > nine months	0.13	0.025 (0.022)	0.24	2604
Duration exclusive if total duration one year or less	11.79	1.492 (0.686)	0.34	2604
Introduced food due to work	0.05	-0.025 (0.014)	0.36	2134
Stopped Breastfeeding due to work	0.19	-0.057 (0.022)	0.16	2141

Notes Standard errors in parentheses. Obs=# of observations. p-values are for the indicated restrictions on individual year of birth dummy variables.

Table 6: Estimated impact of longer maternity leave mandates on health in NLSCY

	Pre- Reform Mean	POST	P-value 1999=0, 2000=0	P-value 2001=2002	Obs.	POST with Unemployment Control
7-12 months						
Mother's Depression	4.24	-0.379 (0.266)	0.27	0.49	1725	-0.259 (0.266)
Mother's health	1.88	-0.007 (0.056)	0.01	0.74	1805	-0.004 (0.054)
Child's in excellent health	0.73	0.066 (0.027)	0.28	0.06	1805	0.081 (0.027)
Child's weight	9.38	-0.095 (0.089)	0.00	0.69	1725	-0.156 (0.086)
Child injured in last 12 months	0.02	0.006 (0.010)	0.68	0.81	1805	0.006 (0.010)
Ear infections	0.26	-0.060 (0.027)	0.23	0.02	1804	-0.068 (0.027)
Chronic Condition	0.12	-0.041 (0.020)	0.84	0.35	1805	-0.030 (0.019)
13-24 months						
Mother's Depression	4.06	-0.721 (0.205)	0.98	0.56	2796	-0.564 (0.204)
Mother's health	1.89	-0.001 (0.047)	0.03	0.21	2941	0.045 (0.044)
Child's Health	0.66	0.013 (0.025)	0.13	0.04	2968	0.028 (0.024)
Child's weight	11.63	0.044 (0.098)	0.00	0.63	2735	-0.069 (0.088)
Ear infections	0.50	-0.098 (0.026)	0.67	0.16	2967	-0.114 (0.024)
Asthma	0.05	-0.026 (0.010)	0.85	0.95	2965	-0.023 (0.010)
Allergies	0.08	-0.004 (0.013)	0.84	0.04	2968	-0.004 (0.013)
Chronic condition	0.13	-0.013 (0.017)	0.25	0.073	2968	-0.021 (0.016)
25-29 months						
Mother's Depression	4.06	0.456 (0.534)	0.28	NA	1288	0.753 (0.558)
Mother's health	1.91	0.257 (0.112)	0.44	NA	1371	0.281 (0.116)
Child's Health	0.67	-0.093 (0.059)	0.281	NA	1390	-0.094 (0.060)

Child's weight	13.63	0.163 (0.212)	0.47	NA	1022	0.145 (0.222)
Ear infections	0.57	-0.024 (0.059)	0.47	NA	1389	0.037 (0.061)
Asthma	0.10	-0.027 (0.033)	0.80	NA	1389	-0.020 (0.035)
Allergies	0.09	-0.031 (0.029)	0.46	NA	1390	-0.028 (0.031)
Chronic condition	0.16	-0.069 (0.035)	0.32	NA	1390	-0.051 (0.037)

Notes Standard errors in parentheses. NA=not applicable, Obs=# of observations. p-values are for the indicated restrictions on individual year of birth dummy variables.

Table 7: Difference in differences estimates of impact of longer maternity leave mandates on health in NLSCY

	<i>WAVE5</i>	<i>YNG*WAVE5</i>	Obs.
13-24 months			
Mother's Depression	-0.581 (0.286)	-0.075 (0.316)	5750
Mother's health	0.079 (0.057)	-0.033 (0.066)	6015
Child's Health	0.155 (0.031)	-0.084 (0.035)	6066
Ear infections	-0.101 (0.033)	-0.024 (0.037)	6061
Asthma	-0.016 (0.022)	-0.024 (0.020)	6059
Allergies	0.036 (0.017)	-0.024 (0.021)	6065
Chronic condition	0.015 (0.021)	-0.006 (0.025)	6065

Notes Standard errors in parentheses. Obs=# of observations.

Table 8: Estimated impact of longer maternity leave mandates on development and environment in NLSCY

	Pre- Reform Mean	POST	P-value 1999=0, 2000=0	P-value 2001=2002	Obs.	POST with Unemployment Control
7-12 months						
Positive Parenting	18.19	0.294 (0.115)	0.62	0.97	1774	0.277 (0.118)
Hostile Parenting	1.49	0.110 (0.098)	0.90	0.30	1796	0.130 (0.095)
Family Function	8.59	0.466 (0.340)	0.00	0.032	1755	0.516 (0.337)
Difficult Child	1.94	-0.032 (0.080)	0.38	0.70	1795	-0.028 (0.014)
Upset to change in routine	1.88	0.293 (0.098)	0.31	0.04	1196	0.008 (0.022)
Mood changes of child	2.19	0.182 (0.010)	0.21	0.13	1793	0.156 (0.095)
Attention child requires	3.33	0.026 (0.108)	0.12	0.97	1792	-0.010 (0.106)
Age: feed self	8.28	-0.846 (0.156)	0.07	0.19	718	-0.874 (0.166)
Age: first words	8.32	-0.618 (0.402)	0.69	0.41	176	-0.558 (0.529)
Frequency child is read to	4.32	0.109 (0.060)	0.47	0.01	1800	0.113 (0.059)
Frequency child is sung to	4.75	-0.600 (0.083)	0.53	0.39	1202	-0.644 (0.089)
Parent/Child group	0.05	0.079 (0.020)	0.19	0.74	1804	0.082 (0.019)
Standardized Motor/Social Score	99.44	-1.190 (0.935)	0.04	0.46	1697	-1.798 (0.092)

Notes: Standard errors in parentheses. Obs=# of observations. p-values are for the indicated restrictions on individual year of birth dummy variables.

Table 9: Estimated impact of longer maternity leave mandates on development and environment

	Pre-Reform Mean	POST	P-value 1999=0, 2000=0	P-value 2001=2002	Obs.	POST with Unemployment Control
13-24 months						
Positive Parenting	17.92	0.213 (0.101)	0.59	0.55	2954	0.221 (0.096)
Hostile Parenting	2.64	0.116 (0.084)	0.23	0.03	2954	0.107 (0.078)
Family Function	9.05	-0.459 (0.250)	0.2	0.89	2861	-0.302 (0.247)
Difficult Child	2.25	-0.282 (0.062)	0.32	0.01	2950	0.024 (0.011)
Upset to change in routine	2.24	-0.114 (0.076)	0.90	0.82	2077	0.016 (0.017)
Mood changes of child	2.74	-0.277 (0.080)	0.15	0.06	2948	-0.101 (0.075)
Attention child requires	3.42	-0.202 (0.087)	0.85	0.28	2949	-0.151 (0.083)
Response to new person		-0.222 (0.089)	0.12	0.25	2949	-0.072 (0.084)
Age: feed self	10.02	-1.362 (0.156)	0.09	0.93	2020	-1.353 (0.177)
Age: first words	10.17	-0.712 (0.173)	0.22	0.75	1985	-0.577 (0.191)
Frequency child is read to	4.68	-0.039 (0.041)	0.22	0.68	2959	-0.008 (0.040)
Frequency child is sung to	4.71	-0.364 (0.055)	0.66	0.43	2088	-0.369 (0.059)
Parent/Child group	0.09	0.036 (0.018)	0.11	0.40	2968	0.045 (0.018)
Standardized Motor/Social Score	102.43	0.585 (0.810)	0.31	0.21	2848	0.673 (0.779)

Notes Standard errors in parentheses. Obs=# of observations. p-values are for the indicated restrictions on individual year of birth dummy variables.

Table 10: Difference in difference estimates of the impact of longer maternity leave mandates on development and environment in NLSCY

	<i>WAVE5</i>	<i>YNG*WAVE5</i>	Obs.
<hr/>			
13-24 months			
Family Function	0.362 (0.330)	-0.521 (0.359)	5858
Difficult Child	-0.325 (0.088)	-0.037 (0.092)	6017
Upset to change in routine	-0.085 (0.082)	-0.025 (0.110)	4372
Mood changes of child	0.007 (0.104)	-0.252 (0.117)	6014
Attention child requires	0.086 (0.106)	-0.046 (0.124)	6017
Response to new person	0.147 (0.199)	-0.255 (0.124)	6016
Frequency child is read to	0.152 (0.064)	-0.111 (0.055)	5278
Frequency child is sung to	-0.135 (0.049)	-0.238 (0.074)	4406
Parent/Child group	0.138 (0.021)	-0.042 (0.026)	6060
Standardized Motor/Social Score	-0.001 (0.963)	1.499 (1.116)	5890

Notes Standard errors in parentheses. Obs=# of observations.

Table 11: Estimated impact of longer maternity leave mandates on development and environment in NLSCY

	Pre- Reform Mean	POST	P-value 1999=0, 2000=0	Obs.	POST with Unemployment Control
<hr/> 25-29 months <hr/>					
Positive Parenting	17.72	0.328 (0.193)	0.68	1374	0.321 (0.204)
Family Function		-0.088 (0.485)	0.13	1336	0.196 (0.509)
Difficult Child	2.17	-0.035 (0.145)	0.00	1371	0.020 (0.030)
Upset to change in routine	2.18	0.171 (0.159)	0.00	1374	0.060 (0.032)
Mood changes of child	2.74	0.307 (0.213)	0.00	1370	0.463 (0.217)
Attention child requires	3.25	0.268 (0.191)	0.05	1372	0.368 (0.199)
Frequency child is read to	4.78	-0.008 (0.058)	0.06	1385	-0.030 (0.059)
Frequency child is sung to	4.64	-0.025 (0.084)	0.05	1385	-0.012 (0.089)
Parent/Child group	0.13	0.022 (0.044)	0.07	1385	0.012 (0.046)
Standardized Motor/Social Score	100.93	0.569 (1.336)	0.18	1379	0.830 (1.370)
Has told about soiled pants, no cry	0.82	0.093 (0.033)	0.16	1380	0.099 (0.037)
Has gone to toilet alone	0.44	0.120 (0.051)	0.65	1380	0.123 (0.053)
Has counted 3 objects correctly	0.78	0.080 (0.049)	0.92	1381	0.080 (0.051)

Notes Standard errors in parentheses. Obs=# of observations. p-values are for the indicated restrictions on individual year of birth dummy variables.

Figure 1: Estimates of child's age (months) the mother returned to work by birth cohort, relative to 1998 births, age13-24 month old sample.

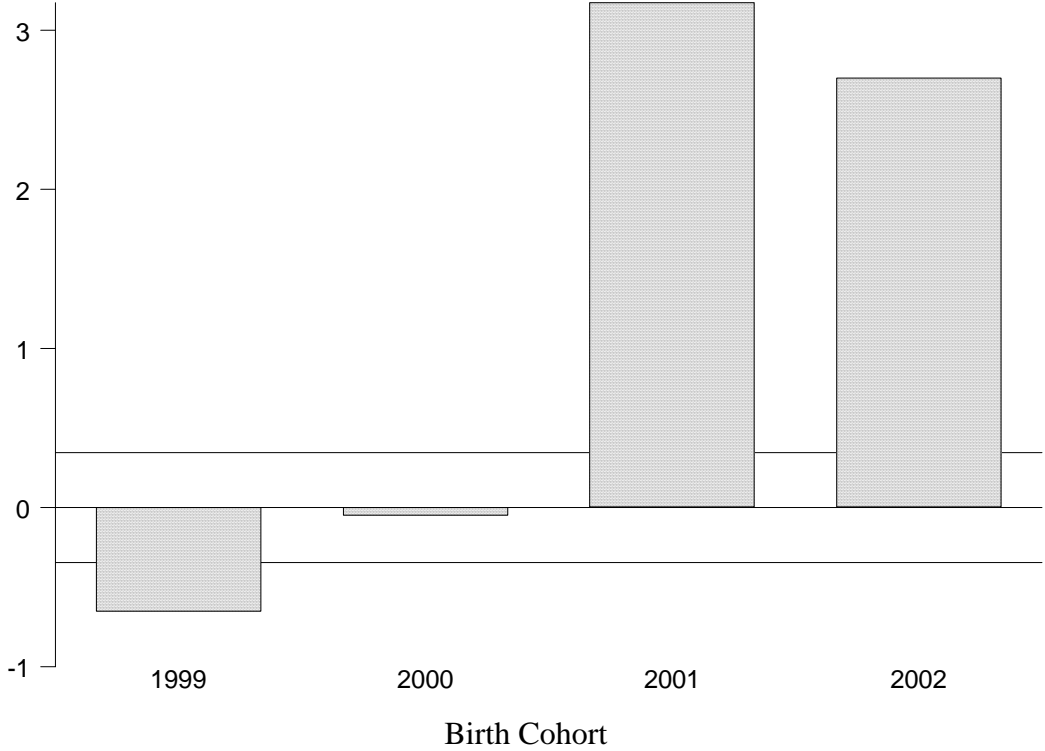
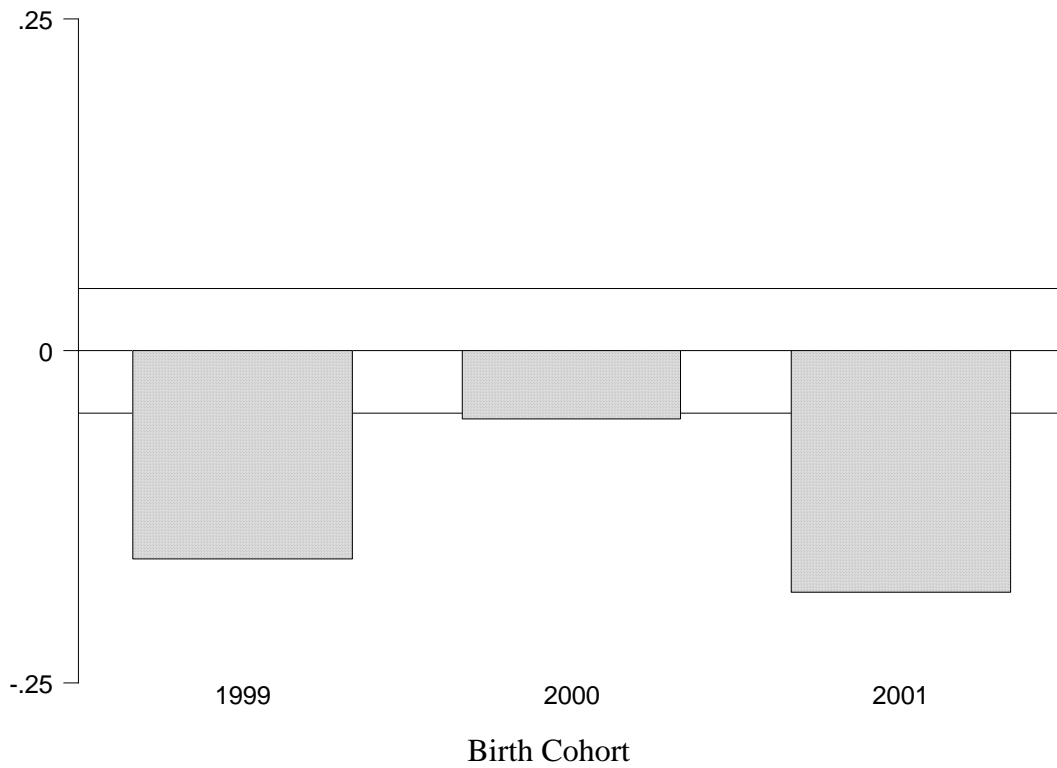


Figure 2: Estimates of proportion of mothers who have returned to work by birth cohort, relative to 1998 births, age 25-29 month sample.



Appendix

Table A1: Estimated impact of longer maternity leave mandates on mothers' labour supply by year of birth

	1999	2000	2001	2002
7-12 months				
Mother has returned to work	-0.123 (0.067)	-0.053 (0.038)	-0.401 (0.057)	-0.318 (0.035)
Mother currently employed	-0.009 (0.063)	0.028 (0.036)	-0.125 (0.068)	-0.065 (0.038)
Hours when returned to work	1.037 (2.276)	-1.434 (1.321)	1.799 (2.992)	0.343 (1.753)
Continuous work since return	0.001 (0.042)	-0.036 (0.052)	0.036 (0.052)	0.025 (0.037)
13-24 months				
Mother has returned to work	-0.057 (0.044)	-0.032 (0.041)	-0.092 (0.043)	-0.107 (0.045)
Mother currently employed	-0.050 (0.043)	-0.005 (0.040)	-0.073 (0.042)	-0.080 (0.044)
Mother returned in 12 months	-0.040 (0.045)	-0.018 (0.041)	-0.119 (0.044)	-0.105 (0.045)
Child's age at return to work	-0.657 (0.362)	-0.054 (0.301)	3.174 (0.359)	2.700 (0.360)
Hours when returned to work	-1.681 (1.326)	0.772 (1.186)	0.528 (1.267)	2.338 (1.419)
Continuous work since return	-0.042 (0.044)	-0.025 (0.033)	-0.012 (0.037)	0.029 (0.030)
25-29 months				
Mother has returned to work	-0.157 (0.042)	-0.052 (0.040)	-0.182 (0.060)	NA
Mother currently employed	-0.112 (0.043)	-0.010 (0.043)	-0.087 (0.061)	NA
Mother returned in 12 months	-0.188 (0.044)	0.078 (0.043)	-0.203 (0.061)	NA
Child's age at return to work	1.446 (0.637)	1.242 (0.614)	4.279 (0.687)	NA
Hours when returned to work	3.240 (1.377)	4.148 (2.146)	3.139 (2.265)	NA
Continuous work since return	-0.030 (0.043)	-0.144 (0.057)	-0.061 (0.066)	NA

Table A2: Estimated impact of longer maternity leave mandates on non parental care by year of birth

	1999	2000	2001	2002
7-12 months				
In care	0.004 (0.068)	0.059 (0.039)	-0.151 (0.063)	-0.148 (0.036)
Hours if in Care	-0.171 (3.083)	1.076 (2.225)	-5.004 (3.450)	-6.390 (2.247)
Care in centre	0.012 (0.022)	0.025 (0.013)	0.004 (0.019)	0.002 (0.010)
Care at own home	-0.022 (0.045)	0.013 (0.026)	-0.005 (0.047)	0.035 (0.023)
Care at other's home	0.016 (0.061)	0.023 (0.035)	-0.151 (0.050)	-0.113 (0.031)
Care in other's home unlicensed	0.033 (0.061)	0.015 (0.034)	-0.139 (0.046)	-0.104 (0.029)
13-24 months				
In care	-0.037 (0.044)	0.009 (0.042)	-0.027 (0.044)	0.051 (0.044)
Hours if in Care	-1.535 (1.837)	-0.446 (1.763)	-0.751 (1.727)	-2.430 (2.002)
Care in centre	-0.010 (0.022)	0.036 (0.022)	0.004 (0.024)	0.030 (0.023)
Care at own home	0.020 (0.033)	-0.028 (0.031)	-0.014 (0.034)	-0.036 (0.029)
Care at other's home	-0.048 (0.037)	-0.005 (0.037)	-0.017 (0.037)	-0.058 (0.045)
25-29 months				
In care	-0.000 (0.043)	0.089 (0.044)	-0.015 (0.060)	NA
Hours if in Care	-1.703 (2.206)	-3.387 (2.115)	-0.663 (2.432)	NA
Care in centre	-0.006 (0.020)	0.052 (0.024)	0.036 (0.036)	NA
Care at own home	0.027 (0.030)	0.078 (0.030)	-0.077 (0.032)	NA
Care at other's home	-0.013 (0.038)	-0.032 (0.038)	0.033 (0.052)	NA

Table A3: Estimated impact of longer maternity leave mandates on breastfeeding by year of birth

	1999	2000	2001
Incidence	-0.005 (0.024)	-0.032 (0.026)	-0.008 (0.025)
One year or less	0.022 (0.028)	-0.002 (0.027)	-0.036 (0.028)
Duration if one year or less	0.311 (1.310)	0.789 (1.382)	2.701 (1.342)
Duration > one month	-0.025 (0.036)	-0.061 (0.036)	0.018 (0.034)
Duration > three months	0.036 (0.042)	0.018 (0.041)	0.053 (0.041)
Duration > six months	0.028 (0.035)	0.051 (0.036)	0.095 (0.036)
Duration > nine months	0.000 (0.029)	0.044 (0.032)	0.044 (0.030)
Duration exclusive if total duration one year or less	1.249 (0.858)	0.842 (0.895)	2.265 (0.902)
Introduced food due to work	0.028 (0.024)	0.001 (0.021)	-0.016 (0.019)
Stopped Breastfeeding due to work	0.059 (0.038)	-0.002 (0.035)	-0.038 (0.032)

Table A4: Estimated impact of longer maternity leave mandates on health by year of birth

	1999	2000	2001	2002
7-12 months				
Mother's Depression	0.293 (0.696)	0.578 (0.357)	0.226 (0.357)	-0.157 (0.323)
Mother's health	0.386 (0.124)	0.043 (0.063)	0.014 (0.112)	0.053 (0.065)
Child's Health	0.035 (0.061)	0.055 (0.034)	0.170 (0.049)	0.081 (0.033)
Child's weight	0.085 (0.161)	-0.354 (0.094)	-0.168 (0.207)	-0.252 (0.105)
Child injured in last 12 months	0.018 (0.023)	-0.004 (0.010)	0.010 (0.017)	0.006 (0.011)
Ear infections	-0.093 (0.061)	-0.038 (0.032)	-0.186 (0.051)	-0.069 (0.033)
Chronic condition	0.009 (0.051)	0.016 (0.027)	-0.054 (0.031)	-0.029 (0.025)
13-24 months				
Mother's Depression	-0.072 (0.402)	-0.040 (0.346)	-0.849 (0.390)	-0.598 (0.320)
Mother's health	0.157 (0.079)	0.172 (0.072)	0.164 (0.076)	0.045 (0.078)
Child's Health	0.085 (0.043)	0.013 (0.039)	0.096 (0.042)	-0.011 (0.043)
Child's weight	-0.320 (0.143)	-0.469 (0.125)	-0.273 (0.140)	0.726 (0.081)
Ear infections	-0.026 (0.046)	-0.034 (0.041)	-0.099 (0.044)	-0.170 (0.040)
Asthma	0.010 (0.019)	0.005 (0.017)	-0.020 (0.018)	-0.018 (0.018)
Allergies	-0.008 (0.022)	-0.012 (0.022)	0.003 (0.022)	-0.045 (0.017)
Chronic condition	-0.039 (0.026)	-0.034 (0.027)	-0.039 (0.027)	-0.051 (0.025)
25-29 months				
Mother's Depression	-0.305 (0.407)	-0.667 (0.416)	0.097 (0.594)	NA
Mother's health	-0.105 (0.082)	-0.044 (0.080)	0.206 (0.120)	NA
Child's Health	0.071 (0.044)	0.043 (0.043)	-0.053 (0.066)	NA
Child's weight	-0.329 (0.272)	-0.022 (0.164)	0.140 (0.229)	NA
Ear infections	0.013 (0.046)	-0.039 (0.045)	0.012 (0.065)	NA

Asthma	-0.013 (0.030)	-0.019 (0.029)	-0.039 (0.037)	NA
Allergies	0.031 (0.025)	0.013 (0.025)	-0.016 (0.032)	NA
Chronic condition	0.035 (0.035)	-0.016 (0.034)	-0.065 (0.040)	NA

Table A5: Estimated impact of longer maternity leave mandates on behaviour and development by year of birth

	1999	2000	2001	2002
7-12 months				
Positive Parenting	-0.236 (0.289)	0.046 (0.149)	0.286 (0.219)	0.293 (0.148)
Hostile Parenting	-0.019 (0.200)	0.049 (0.119)	0.342 (0.235)	0.096 (0.110)
Family Function	-0.547 (0.732)	1.110 (0.369)	1.354 (0.533)	0.832 (0.421)
Difficult Child	-0.040 (0.153)	-0.138 (0.100)	-0.148 (0.169)	-0.086 (0.098)
Upset to change in routine	NA	-0.176 (0.173)	-0.167 (0.207)	0.197 (0.172)
Mood changes of child	-0.072 (0.189)	-0.196 (0.112)	-0.143 (0.172)	0.130 (0.123)
Attention child requires	-0.394 (0.196)	-0.113 (0.132)	-0.065 (0.198)	-0.058 (0.130)
Age: feed self	NA	0.461 (0.251)	-0.731 (0.284)	-0.426 (0.241)
Age: first words	NA	0.265 (0.667)	-0.889 (0.846)	-0.317 (0.682)
Frequency child is read to	-0.046 (0.149)	0.093 (0.089)	-0.152 (0.140)	0.192 (0.074)
Frequency child is sung to		0.088 (0.139)	-0.658 (0.212)	-0.506 (0.143)
Parent/Child group	0.031 (0.032)	0.031 (0.019)	0.083 (0.040)	0.098 (0.022)
Standardized Motor/Social Score	-2.511 (1.781)	-2.773 (1.131)	-1.118 (2.123)	-2.750 (1.119)
13-24 months				
Positive Parenting	0.120 (0.177)	0.152 (0.168)	0.354 (0.172)	0.234 (0.152)
Hostile Parenting	-0.122 (0.134)	-0.222 (0.132)	-0.114 (0.128)	0.233 (0.133)
Family Function	0.054	1.029	-0.199	-0.128

	(0.423)	(0.401)	(0.426)	(0.445)
Difficult Child	-0.158	-0.073	-0.489	-0.156
	(0.109)	(0.109)	(0.103)	(0.096)
Upset to change in routine		-0.020	-0.129	-0.98
		(0.156)	(0.092)	(0.150)
Mood changes of child	0.071	0.271	-0.261	0.030
	(0.140)	(0.139)	(0.127)	(0.128)
Attention child requires	0.090	0.033	-0.205	-0.005
	(0.160)	(0.147)	(0.150)	(0.145)
Response to new person	0.070	0.323	-0.167	0.037
	(0.160)	(0.158)	(0.156)	(0.136)
Age: feed self	NA	-0.449	-1.523	-1.503
		(0.263)	(0.197)	(0.249)
Age: first words	NA	-0.347	-0.808	-0.898
		(0.285)	(0.222)	(0.297)
Frequency child is read to	0.119	0.065	0.032	0.065
	(0.069)	(0.066)	(0.072)	(0.068)
Frequency child is sung to	NA	0.033	-0.329	-0.419
		(0.076)	(0.068)	(0.110)
Parent/Child group	0.029	0.050	0.054	0.087
	(0.026)	(0.029)	(0.029)	(0.033)
Standardized Motor/Social Score	2.106	0.656	2.533	0.440
	(1.377)	(1.209)	(1.432)	(1.298)
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25-29 months				
Positive Parenting	0.158	0.084	0.411	NA
	(0.184)	(0.193)	(0.231)	
Difficult Child	-0.165	-0.422	-0.264	NA
	(0.101)	(0.094)	(0.133)	
Upset to change in routine	-0.345	-0.360	-0.086	NA
	(0.110)	(0.102)	(0.144)	
Mood changes of child	-0.205	-0.389	0.081	NA
	(0.125)	(0.116)	(0.164)	
Attention child requires	0.183	-0.110	0.279	NA
	(0.130)	(0.121)	(0.171)	
Frequency child is read to	0.030	0.090	0.038	NA
	(0.043)	(0.040)	(0.056)	
Frequency child is sung to	0.091	-0.054	-0.019	NA
	(0.064)	(0.059)	(0.083)	
Parent/Child group	-0.008	0.052	0.040	NA
	(0.028)	(0.030)	(0.048)	
Standardized Motor/Social Score	-1.608	-1.533	-0.0557	NA
	(1.000)	(0.927)	(1.305)	
Has told about soiled pants, no	0.049	0.004	0.109	NA
	(0.029)	(0.027)	(0.038)	

cry				
Has gone to toilet alone	0.012 (0.037)	-0.019 (0.034)	0.116 (0.048)	NA
Has counted 3 objects correctly	0.011 (0.031)	0.011 (0.029)	0.088 (0.041)	NA
