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## Analytical Studies: Methods and References

# Estimating Parental Leave in Canada Using Administrative Data

by Feng Hou, Rachel Margolis and Michael Haan

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# Estimating Parental Leave in Canada Using Administrative Data

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## **Abstract**

This document describes the procedures for using linked administrative data sources to estimate paid parental leave rates in Canada and the issues surrounding this use. The paper first discusses the advantages and limitations of major relevant survey and administrative data sources for studying paid parental leave. It then outlines the steps taken to match the T1 Family File with the linkage file consisting of the T4 file, the Record of Employment (ROE) and the Longitudinal Employment Analysis Program, for the purpose of estimating parental leave rates. It further evaluates alternative ways of identifying parental leave based on information from the ROE and employment insurance benefits.

# 1 Introduction

Extended maternity or parental leave policies have been advocated for and implemented in many countries. These policies are designed to help parents stay home with their infants by giving parents legal job protection and providing financial support when they take leave from work (Baird and O'Brien 2015; McKay, Mathieu and Doucet 2016). These policies have generated intensive and growing research interest because of their potential to increase women's labour force participation, to engage both women and men in childrearing, to help parents better manage the demands of employment and infant care, and to improve child well-being (Moss and Deven 2015). Research has also suggested that the behavioural responses to paid parental leave policies are complex and often depend on the country's social and policy context and family circumstances (Hegewisch and Gornick 2011; Ray, Gornick and Schmitt 2010).

Since they were first introduced in Canada in 1971, paid parental leave policies have evolved.<sup>1</sup> The first policy introduced in 1971 allowed mothers with 20 or more insurable weeks of work to claim 15 weeks of unemployment insurance benefits during the 17-week period surrounding the birth or adoption of a child (Schwartz 1988). In 1990 the policy was modified to provide 10 weeks of parental leave benefits that could be used by either parent. In 2000 the federal government significantly changed the employment insurance (EI) program to allow parents to stay home with their infants for up to one year with the security of re-entry into their current employment. Parental leave benefits were extended to 35 weeks.<sup>2</sup> The qualifying criterion was also decreased from 700 hours to 600 hours worked in the last 52 weeks (Marshall 2003). Starting from 2006, the province of Quebec began to allow 18 weeks of maternity leave for new biological mothers, 32 weeks for sharing between new parents and 5 weeks of parental leave dedicated to biological fathers (Marshall 2008).

To what extent do new mothers and fathers take parental leave? How has the trend changed over time? What are the determinants and consequences of paid parental leave? These important questions can only be answered with solid empirical data. The main data source that has been used to produce estimates of parental leave in Canada is Statistics Canada's annual Employment Insurance Coverage Survey (EICS). Several other survey datasets also contain related information, and some have been used to study parental leave. This report first examines the strengths and weaknesses of existing surveys for studying the use of parental leave in Canada. Administrative data have potential for examining some aspects of parental leave that cannot be studied well with existing surveys, such as the effect of paid parental leave on mothers' return to work and subsequent fertility. However, using administrative data to study parental leave is not straightforward, and there are some major limitations. This report describes the procedure for matching the following administrative data sources for this purpose: the T1 Family File (T1FF) and the linkage file consisting of the T4 file, the Record of Employment (ROE), and the Longitudinal Employment Analysis Program (LEAP). The technical issues with using the linked administrative sources to estimate parental leave are discussed, along with possible solutions.

This paper has five subsequent sections. Section 2 contains a brief discussion of the survey data sources that contain information on parental leave. Section 3 introduces the components of administrative datasets that can be linked to study parental leave. Section 4 describes the data linkage procedures. Section 5 contains a discussion of alternative ways to identify parental leave with administrative data and compares estimates based on alternative measures. Section 6 concludes this report.

- 
1. This paragraph is not intended to provide a comprehensive overview of changes in parental policies in Canada and variations across provinces.
  2. The paid leave contains two components: maternity leave and parental leave. EI maternity benefits can be paid to a new mother for a maximum period of 15 weeks and must end 17 weeks after the week of the expected or actual birth of the child, whichever is later. An expectant mother can start receiving maternity benefits during the eighth week before the due date or before the actual week of childbirth. EI parental benefits can be paid to one parent or both parents combined for a maximum period of 35 weeks and must end 52 weeks after the week when the child was born or adopted (ESDC 2016a).

## 2 Major survey data sources relevant to parental leave

Several Statistics Canada household surveys collect information relevant to parental leave. Each data source is briefly described, as are its strengths and weaknesses for the study of parental leave. These include the EICS, the General Social Survey (GSS) on Family, the National Longitudinal Survey of Children and Youth (NLSCY), and the 2010 Survey of Young Canadians (SYC).

The most common data source used to study parental leave is the EICS. As a survey of a subset of the target population of Statistics Canada's flagship Labour Force Survey, the EICS is a voluntary, cross-sectional survey that is designed to provide annual estimates of the coverage of the EI program. The survey targets individuals who were unemployed in the reference week or who could potentially be eligible for EI given their recent status in the labour market. This includes those who were employed part time, those who were not in the labour force during the reference week, those who started their current job during the previous three months, and mothers of infants less than 1 year old. For regular EI coverage, the survey includes information on respondents' last job, work in the last year, reasons for job interruption, EI claims and receipt of benefits, income source, and job search activities. Relevant to maternity and parental benefits, the survey asks mothers of an infant whether they claimed or applied for maternity and parental benefits, whether they received EI benefits, and why they did not receive benefits (if this was the case). It also asks about the timing and circumstances of the return to work and the income adequacy of households with young children. The survey further asks new mothers whether their spouses claimed parental benefits or intended to claim them, whether their spouses received parental benefits, and how the couple split the time allocation of parental benefits. The EICS provides a timely and comprehensive picture of the take-up rate of parental leave, the duration of parental benefits, the reasons for some mothers and fathers not taking parental leave,<sup>3</sup> and the plans of parents to return to work.

The main strength of the EICS for studying parental leave is the rich set of questions pertaining to leave-taking that are asked directly to survey respondents. The information collected includes detailed reasons, intentions and timing, which cannot be obtained from administrative data sources. A second strength is that the survey contains some sociodemographic characteristics, including education, mother tongue and immigration status, and, for immigrants, year of immigration and source country. A third strength is that the survey has been repeated multiple times. The questionnaire on parental leave was introduced in 2000 (although the EICS was first collected in 1997). In 2004 it went through a major redesign, so the current comparable data go back only to 2004.

There are several important limitations. First, the EICS is a cross-sectional survey. Although some retrospective data are collected on the last job and work in the past year, it does not contain a longer history of work and family structure. In particular, it cannot be used to examine the long-term impact of parental leave on the mother's labour force participation, family division of labour and subsequent fertility behaviours. Second, although the EICS includes a sample of around 10,000 people per year, its sample of new mothers is relatively small (about 1,000), which makes it impossible to study local areas or small population groups.

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3. For instance, the following reasons are listed for mothers not claiming or applying for parental benefits: "1. Working or receiving pay from work; 2. Not contributing to the program; 3. Not working enough; 4. Has not worked recently (eg. for 2 years); 5. Did not want benefits (too low, too much trouble); 6. Did not need benefits (have other sources of income); 7. Did not know enough about the program; 8. Never thought about it; and 9. Other – Specify" (Statistics Canada n.d., PM\_Q08). Reasons for a new mother's spouse not applying for parental benefits comprise: "1. Spouse is not eligible (not working, not paying premiums, self-employed); 2. Impossible to take time off work (include spouse is working); 3. Money related reasons; 4. Mother wants to stay home (include by choice, more practical, nursing); 5. Spouse does not want to stay home; 6. Did not know that he could claim benefits; and 7. Other – Specify" (Statistics Canada n.d., PF\_Q02).

The second survey that can be used to study parental benefits in Canada is the GSS on Family. The GSS on Family was first conducted in 1990 and has been repeated approximately every five years since then. For instance, the 2011 GSS collected information on respondents' labour market activities before and after the birth or adoption of the youngest child, on time off before and after the birth or adoption of the child, on the other parent's time off, on the amount and duration of maternity and parental leave benefits received, on reasons for not receiving any benefits, and on the return to work after the leave. In addition to questions related to parental leave, the GSS on Family also collects information on work history, family history, intentions to form (or re-form) a union, children in the family, fertility intentions, decision making within the household, and family resiliency. Each GSS also gathers sociodemographic information such as age, sex, education, religion, ethnicity, income and subjective well-being (Statistics Canada 2013). The main advantage of the GSS is that it allows researchers to examine a broad set of socioeconomic correlates of parental leave. However, similar to the EICS, it is cross-sectional. Although it collects rich retrospective information on work and family history, it cannot be used to study the impact of parental leave on subsequent changes in family structure, family labour force participation and fertility.

The NLSCY is the third survey that includes information on parental leave. Starting in 1994, the survey collected information from longitudinal and cross-sectional samples of children and their parents every 2 years for a total of 14 years. There were about 22,800 children in the first panel, and 52% of them remained in the final cycle (Statistics Canada 2010). This survey provides retrospective data on whether new parents worked after childbirth, and, if so, when they started work after the birth and what hours they usually worked at that time. The NLSCY collected extensive information on parents' socioeconomic status, health, and family and work history; on children's behavioural, emotional and health outcomes; and on the environment in which children grew up. Because of this, the survey can be used to study the impact of the timing of parents' return to work and work intensity after childbirth on a wide range of outcomes for parents and children. Although the survey was discontinued in 2009 after eight cycles of data collection, the longitudinal cohort has been linked to administrative data, and its long-term employment and earnings trajectory can therefore be examined.

The 2010 SYC is the fourth survey that has been used to study parental leave (Findlay and Kohen 2012). The survey targeted Canadian children 1 to 9 years of age, and the respondents were their parents or guardians. With a sample of 10,810 Canadian children, the SYC provides information on the prevalence of various risk and protective factors for children, and cognitive, emotional and behavioural outcomes. For children aged 1 to 3, information was collected on parents' leave taken during the pregnancy or after the birth, and the length of paid and unpaid leave. Findlay and Kohen (2012) used this survey to estimate the prevalence of mothers and fathers taking leave, and results are generally consistent with those from the EICS. Furthermore, they examined how the amount of leave time parents take from work to spend with their child at the time of the birth or adoption was associated with child and maternal health. The SYC was a single cross-sectional survey and thus provides only one snapshot of the prevalence and correlates of parental leave in Canada.



### 3 Administrative data sources relevant to parental leave

Two administrative data sources can be linked to study parental leave in Canada. One is the T1FF. The other is the T4–ROE–LEAP linkage.

The T1FF includes all individuals who filed an individual tax return (T1) in a given year or who received the Canada Child Tax Benefit (CCTB) in that year, their non-filing spouses, their non-filing children identified from three sources (the CCTB file, the birth files and a historical file), and filing children who reported the same address as their parent. In 2014 about 75% of the Canadian population filed a tax return. With the addition of non-filers identified from other files or from filers' information, the completed T1FF accounts for about 96% of Canada's total population (Statistics Canada 2016).

The family unit in the T1FF is based on Statistics Canada's concept of a census family. A census family includes one or both parents and children (i.e., children who do not live with their spouse or partner and do not have children of their own living at the same address). The T1FF also contains non-family persons (i.e., those living alone, and those living in a household but who are not part of a couple family or lone-parent family).

For the purpose of studying parental leave, the T1FF can be used to identify parents with newborns, who are defined as children born in the tax (calendar) year. Most children do not file tax returns because they have low or no income. Before 1993, non-filing children were identified from information on their parents' tax forms. Information from the Federal Family Allowance Program was used to assist in identifying children. Starting in 1993, children were added to the family by using the CCTB file, the provincial birth files and the T1FF of the previous year. The introduction of the Universal Child Care Benefit (UCCB) program in 2006 has allowed more children under the age of 6 to be identified and has improved coverage of children in the T1FF data compared with Statistics Canada's official population estimates (Statistics Canada 2016). The implication of these changes for the historical comparability of parents with newborn children will be briefly discussed in the following section on data linkage procedures.

The second data source that can be linked to study parental leave is the T4–ROE–LEAP linkage. This linkage was created and is maintained by the Social Analysis and Modelling Division of Statistics Canada. A T4 Form (*Statement of Remuneration Paid*) is completed and issued annually by employers for each employee. A T4E Form (*Statement of Employment Insurance and Other Benefits*) is issued by the government to individuals who receive EI benefits in the tax year and is filed with the T1 income tax return for the tax year. An ROE is prepared by an employer when an employee experiences a job separation. The employer submits one copy of the ROE to Employment and Social Development Canada, and the employee receives another copy, which is needed to make a claim for EI benefits. The LEAP is created and maintained by Statistics Canada's Economic Analysis Division from various administrative data sources. The dataset contains all enterprises that issue a T4 in Canada. The data do not contain self-employed individuals who do not draw a salary, or businesses composed of individuals or partnerships that do not draw a salary (Lafrance and Leung 2010). The linkage of the T4, the ROE and the LEAP provides job-level information.

Directly relevant to the study of parental leave, the ROE lists specific reasons for a job separation.<sup>4</sup> Until the end of 2002, pregnancy (maternity) and parental leave were combined as one reason in the ROE form. Beginning in 2003, pregnancy (maternity) and parental leave are listed as separate reasons. In the analysis and discussion that follow in this article, maternity leave and parental

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4. Since 2003, the following reasons for job separation are listed in the ROE (Government of Canada n.d.): 1) shortage of work (layoff), 2) strike or lockout, 3) return to school, 4) illness or injury, 5) quit, 6) maternity, 7) retirement, 8) work-sharing, 9) apprentice training, 10) dismissal, 11) leave of absence, 12) parental, 13) compassionate care/parents of critically ill children, and 14) other.

leave are not distinguished, and the term “parental leave” refers to both types of leave. Furthermore, the T4E confirms whether a parent with a newborn child actually received EI benefits. As Section 5, (Estimating parental leave) will show, some new parents received an ROE for pregnancy or parental leave reasons but did not receive EI benefits, while many other new parents received EI benefits without an ROE for pregnancy or parental leave reasons. To complicate the matter further, it is possible that a new parent was issued an ROE in the previous year but received EI benefits in the tax filing year, or that an ROE was issued in the tax filing year but EI benefits were received in the following year.

## 4 Data linkage procedures

The basic procedures for linking administrative datasets to study parental leave involve identifying parents with a newborn child in a tax (calendar) year in the T1FF, and attaching to these new parents the information relevant to parental leave from the T4–ROE–LEAP linkage file.

### 4.1 Newborns in the T1 Family File

In the EICS, parents with a newborn child are defined as those with infants less than 1 year old. For consistency with the EICS, the same definition is applied to identify new parents in the T1FF. Using the same definition facilitates the comparison between the estimated overall parental leave rates from the EICS and administrative data. The exact days and months of birth were not recorded for most newborns in the T1FF until 2006, but have become available since 2007. The sex of children was not coded before 1999 and was mostly missing from 1999 to 2005, but became complete beginning in 2006.

As mentioned earlier, the data sources that were used to incorporate children into the T1FF changed in 1993 and 2006, and these changes affected the coverage of newborn children in the T1FF.<sup>5</sup> Table 1 presents numbers of newborns estimated from the T1FF from 1991 to 2013 and compares them with corresponding numbers of newborns from the vital statistics. The table shows that in 1991 and 1992, the number of newborns in the T1FF was about 1% to 2% more than that in the vital statistics. With the 1993 change in the data sources, the T1FF coverage of newborns became lower than the vital statistics coverage, particularly in the early 2000s. A large increase in the T1FF coverage occurred in 2005, and the coverage ratio relative to the vital statistics has remained stable since.

Given that the UCCB program began in 2006, one would expect that the increase in the coverage of newborns in the T1FF should occur in 2006 rather than in 2005. One possible reason, based on personal communications with the T1FF production team, is that some inconsistencies were corrected in 2005 in the linking steps related to removing or keeping accents and hyphens in names. Another likely reason is that more families with newborns applied for the CCTB in 2005 than in previous years in anticipation of the soon-to-be-implemented UCCB program. The UCCB was announced in February 2006 and implemented in July 2006 (Schirle 2015). When families were filing their tax returns for 2005 in the spring of 2006, those who did not qualify for the CCTB because of high family income would have been motivated to apply for it since the UCCB would be issued to families that had applied for the CCTB.

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5. This study uses a version of the T1FF that has been developed by the Social Analysis and Modelling Division of Statistics Canada specifically for longitudinal analysis. This file corrects inconsistencies in individuals' demographic characteristics and longitudinal identification. People who completed a T1 tax return or who received the CCTB and most of their non-filing spouses and non-filing children under 19 years of age who have previously filed will have a reliable longitudinal identifier and can be followed over time.

**Table 1**  
**Number of newborns from vital statistics and the T1 Family File**

Calendar year	Vital statistics number	T1FF estimates	T1FF / Vital statistics
			ratio
1991	402,533	412,577	1.02
1992	398,643	402,927	1.01
1993	388,394	367,551	0.95
1994	385,114	362,704	0.94
1995	378,016	354,549	0.94
1996	366,200	342,593	0.94
1997	348,598	323,335	0.93
1998	342,418	312,984	0.91
1999	337,249	304,402	0.90
2000	327,882	297,422	0.91
2001	333,744	298,312	0.89
2002	328,802	291,549	0.89
2003	335,202	292,372	0.87
2004	337,072	306,977	0.91
2005	342,176	330,495	0.97
2006	354,617	347,806	0.98
2007	367,864	356,754	0.97
2008	377,886	364,743	0.97
2009	380,863	367,030	0.96
2010	377,213	366,916	0.97
2011	377,636	368,168	0.97
2012	381,869	373,841	0.98
2013	380,323	372,333	0.98

**Sources:** Statistics Canada, CANSIM table 102-4502 and T1 Family File (T1FF).

The possibility that the large 2005 increase was a response to the anticipated introduction of the UCCB is consistent with the changes in the number of newborns by province, family structure and family income, as reported in Table 2. Table 2 presents the annual number of newborns (from 1997 to 2013) in the T1FF by province, parents' marital status and family income.<sup>6</sup> It shows that the 2005 increase in the number of newborns in the T1FF was concentrated in Alberta (13% increase), Ontario (12% increase) and, to a lesser extent, British Columbia (6% increase). High-income families were more likely to be found in these three provinces. The increase in the number of newborns in 2006 was more evenly distributed across provinces, except that Quebec had a higher rate (8%) than most other provinces. By marital status, the large increase in 2005 was concentrated among families with married parents (11%), while in 2006 the increase was higher among families with common-law parents. The 2005 and 2006 increases in the estimated number of newborns in the T1FF occurred almost exclusively among upper-middle-income and high-income families. For instance, in 2005 the number of newborns in the T1FF increased by 117% in families with income of \$150,000 or more and 49% in families with income between \$120,000 and \$149,999, but changed little in families with income less than \$90,000. In 2006 the number grew another 12% to 20% in the top three family income categories. After 2006, the difference in growth rates by family income became small.

6. About 0.2% to 0.5% of newborns could not be linked to a parent using the family identification over the 1997-to-2013 period.

**Table 2-1**  
**Estimated number of newborns, by year, province or territory, parents'**  
**marital status, and family income — 1997 to 2004**

	1997	1998	1999	2000	2001	2002	2003	2004
	number							
<b>Province or territory</b>								
Newfoundland and Labrador	8,445	9,211	7,592	8,864	4,332	4,282	4,214	4,062
Prince Edward Island	1,518	1,440	1,438	1,355	1,316	1,253	1,351	1,320
Nova Scotia	9,272	8,846	8,718	8,218	8,117	7,971	7,809	8,002
New Brunswick	7,497	7,379	7,085	6,836	6,750	6,635	6,627	6,565
Quebec	76,469	69,830	67,014	65,236	66,663	65,530	67,253	71,851
Ontario	116,424	113,850	110,686	107,771	112,874	108,713	106,748	112,773
Manitoba	13,734	13,541	13,286	13,234	13,218	13,075	13,129	13,176
Saskatchewan	12,325	12,193	12,001	11,578	11,828	11,341	11,693	11,651
Alberta	33,051	33,235	32,872	31,754	32,833	32,878	33,366	36,057
British Columbia	38,295	36,584	35,532	34,605	35,534	34,931	35,173	36,007
Territories	1,656	1,506	2,690	1,530	1,472	1,566	1,619	1,676
<b>Parents' marital status</b>								
Married	207,311	197,956	190,865	185,164	185,144	179,518	175,455	183,923
Common law	67,921	66,340	66,873	66,569	67,321	67,452	68,478	73,892
Lone parent	47,403	47,989	45,840	44,534	44,869	43,581	47,254	47,637
<b>Family income</b> <b>(2013 constant dollars)</b>								
Less than \$30,000	94,619	90,914	84,433	82,829	77,196	77,499	80,677	82,481
\$30,000 to \$59,999	96,057	94,296	92,933	89,527	88,529	85,971	85,351	85,168
\$60,000 to \$89,999	74,533	71,853	71,787	69,745	72,563	70,983	69,653	72,246
\$90,000 to \$119,999	37,288	35,402	35,236	34,503	37,474	36,141	36,615	40,761
\$120,000 to \$149,999	12,128	11,855	11,278	11,525	12,719	12,175	12,052	15,051
\$150,000 or more	8,010	7,965	7,911	8,138	8,853	7,782	6,839	9,745

**Source:** Statistics Canada, T1 Family File.

**Table 2-2**  
**Estimated number of newborns, by year, province or territory, parents' marital status, and family income — 2005 to 2013**

	2005	2006	2007	2008	2009	2010	2011	2012	2013
	number								
<b>Province or territory</b>									
Newfoundland and Labrador	4,231	4,407	4,464	4,705	4,627	4,572	4,211	4,040	4,452
Prince Edward Island	1,308	1,402	1,365	1,465	1,441	1,379	1,421	1,291	1,379
Nova Scotia	8,178	8,235	8,607	8,833	8,902	8,649	8,708	8,539	8,257
New Brunswick	6,672	6,909	7,069	7,307	7,237	7,249	6,914	6,812	6,710
Quebec	74,481	80,379	81,844	85,050	85,575	86,363	87,337	87,597	87,347
Ontario	126,745	131,644	133,587	134,678	133,984	135,244	136,401	137,368	134,801
Manitoba	13,654	14,158	14,839	15,049	15,378	15,213	15,248	15,999	16,132
Saskatchewan	11,510	11,979	13,015	13,392	13,971	13,799	13,678	14,055	14,104
Alberta	40,883	43,104	45,088	46,941	47,200	46,472	46,405	50,242	51,776
British Columbia	38,163	39,821	41,567	42,157	43,294	42,584	42,510	42,406	41,858
Territories	1,692	1,810	1,900	1,920	1,910	1,894	1,900	1,885	1,860
<b>Parents' marital status</b>									
Married	204,083	213,586	215,346	216,683	216,395	216,759	217,466	221,382	219,754
Common law	77,734	84,763	90,117	95,781	96,959	95,878	96,251	96,950	97,461
Lone parent	47,850	48,513	50,330	51,462	52,753	53,333	53,352	54,268	53,574
<b>Family income (2013 constant dollars)</b>									
Less than \$30,000	79,361	76,100	75,832	75,694	76,676	74,289	74,317	73,629	70,566
\$30,000 to \$59,999	83,997	85,895	87,485	88,483	90,512	91,164	89,382	88,516	86,251
\$60,000 to \$89,999	75,516	78,873	80,572	81,977	81,026	80,358	80,090	80,382	78,977
\$90,000 to \$119,999	47,197	52,834	55,011	56,893	56,460	56,770	57,510	59,412	59,894
\$120,000 to \$149,999	22,450	26,679	28,719	30,391	31,011	31,301	32,661	34,598	36,034
\$150,000 or more	21,146	26,481	28,174	30,488	30,422	32,088	33,109	36,063	39,067

Source: Statistics Canada, T1 Family File.

## 4.2 Creating a data file of new parents

To create a data file of all new parents, the newborns identified from the T1FF are linked with their parents by family identification (ID) (the variable FIN). A file for all parents in a tax year is first created from the T1FF. This file excludes children, non-family persons, and individuals whose person ID (the variable casenum) was coded as 0 or missing. The file contains selected demographic and income characteristics for parents. For the purpose of studying parental leave, the relevant variables include spouse ID, family composition, age, sex, earnings, income, family income, EI income and province of residence.

In linking newborns with parents, one minor issue is multiple births (e.g., twins and triplets). For the file of new parents, only one birth should be kept in the case of multiple births. About 0.13% to 0.16% of new parents (or 650 to 1,000) had multiple births during the 1990s and 2000s.<sup>7</sup>

Since it is possible that a parent may not take parental leave in the child's birth year, but take the leave in the year after (e.g., if the child is born toward the end of a year), it is necessary to retain

7. In 2013 there were three multiple-birth outliers, each with more than six newborns. Parents with such multiple-birth outliers are excluded from the database.

a parent's EI income in the year following the child's birth year. This is possible by linking the same individual in two subsequent tax years with the longitudinal person ID (casenum).

Some parental information in the year before the newborn's birth year could be useful in studying the factors associated with parental leave, such as family structure, earnings, family income and number of children.<sup>8</sup> The file with this information for the pre-birth year is linked to the new-parent file by longitudinal person ID.

### **4.3 Matching T1 Family File data with the linkage of the T4, the Record of Employment and the Longitudinal Employment Analysis Program**

The T4–ROE–LEAP linkage provides information on whether a parent experienced a job separation specifically for parental leave, as well as information on employers' characteristics. To merge with the new-parent file created above, the T4–ROE–LEAP linkage needs to be transformed from a person–job file to a person file. The transformation does not affect individuals who worked for only one employer (i.e., those who had only one T4 Form or received an ROE from only one employer). For individuals who held multiple jobs in a year, the information on parental leave is aggregated to the person level. Basically, if an individual received an ROE related to parental leave among possible multiple ROEs, he or she is considered to have received an ROE for parental leave. Other information is also retained for possible later analysis, including insured earnings used to establish the EI claim (available only from 1997 on), insured hours used to establish the EI claim, and a derived indicator of whether a job separation is temporary or permanent.<sup>9</sup>

A similar file is created for the year prior to the birth year of the newborn, because a mother could start receiving EI maternity benefits during the eighth week before the due date or before the week of the birth. This situation is common for births that occurred early in the year. In addition, a similar file is created for the year following the birth year of the newborn, because EI parental benefits can be paid for a maximum period of 35 weeks and can be taken within the 52 weeks after the week of childbirth. This situation is important for births that occurred late in the year. The pre-birth-year file, the birth-year file and the post-birth-year file are linked together using the longitudinal person ID. Furthermore, a job-level file is created to include some job-level characteristics, such as firm size, industry, and a worker's first year of work and first and last month of work. For individuals associated with multiple firms, only the record from the firm that paid the highest T4 earnings is retained. This firm-level file is merged with the person file that contains ROE information using the person ID.

The final step is to merge the parent file created from the T1FF with the person file created from the T4 file, the ROE and the LEAP using the person ID as the linkage key. The resultant file contains married or common-law parents and lone parents of newborns. It can be used to estimate the prevalence of parental leave for mothers and fathers separately. To examine how parental leave in a two-parent family is coordinated between the couple (i.e., only the mother taking it, only the father taking it, or both taking it), a family file can be created based on the spouse ID in the T1FF file.

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8. The number of children is derived from the number of children for whom a parent claimed child care expenses. In years prior to 2006, about 7 million to 8 million records had missing values for this information (the variables cch7ccex and cchfccex). In 1998 and 1999, the two variables on the number of children contained some outliers.

9. A temporary separation is defined as a situation where a worker returns to his or her employer during the same year as a job separation or during the year following it. Conversely, a permanent separation is defined as a situation where a worker does not return to his or her employer during the same year as a separation or during the year following it.

## 5 Estimating parental leave

The final step in using administrative data to estimate parental leave is to define parental leave based on the available information. One of the options listed on the ROE is parental (and maternity) leave. However, relying on this to define parental leave vastly underestimates the parental leave rate compared with estimates from the EICS. Therefore, this report presents estimated parental leave rates based on seven different ways of identifying parental leave among parents with newborns. The first definition relies only on the ROE. The last definition, which defines parental leave primarily by whether a new parent received EI benefits, with supplementary ROE information, produces estimates similar to those from the EICS. The seven definitions for estimating parental leave are listed below and are shown in Table 3.

- 1) The parent received an ROE for parental leave in the child's birth year.
- 2) The parent received an ROE for parental leave in the child's birth year and received EI benefits in the same year. This is to ensure that those who were issued an ROE actually received EI benefits.
- 3) The parent received an ROE for parental leave either in the child's birth year or in the following year. This would include parents who had a newborn late in a calendar year and received an ROE in the next year.
- 4) The parent received an ROE for parental leave either in the child's birth year or in the following year, and received EI benefits.
- 5) The parent received an ROE for parental leave in the child's birth year, or in the following calendar year, or in the previous calendar year and the last month of work was after September in the previous year.<sup>10</sup> This would include mothers who started maternity leave two months before the birth of the child.
- 6) Same as 5), and the parent received EI benefits either in the child's birth year or in the year after the birth.
- 7) Either 6), or the parent received EI in the child's birth year.

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10. The ROE contains information on the month in which the ROE was issued in a given year. This information can also be used to identify new mothers who received an ROE in the year before the child was born. For example, if a new mother gave birth in 2013 but received an ROE for maternity leave in December 2012, it is almost certain that the 2012 ROE was issued for the 2013 birth. However, this variable is currently not coded correctly in the T1FF available to the present study.

**Table 3**  
**Estimated percentage of new parents taking parental leave, based on different definitions**

	Parent received parental leave ROE								Employment Insurance Coverage Survey
	In birth-year		In birth-year or post-birth-year		In pre-birth-year, birth-year, or post-birth-year		In pre-birth-year, birth-year, or post-birth-year; or received EI in birth year	Column 7	
	All	EI benefits	All	EI benefits	All	EI benefits			
	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 8		
	percent								
<b>Mothers</b>									
1998	36.1	32.4	37.0	35.1	38.0	35.3	52.1	...	
1999	37.2	33.7	38.1	36.2	39.4	36.5	53.4	...	
2000	37.2	33.3	38.3	36.4	39.9	36.7	53.8	...	
2001	43.0	39.5	43.8	42.4	45.6	42.6	58.8	...	
2002	41.8	38.2	42.6	41.3	45.0	41.5	59.1	...	
2003	41.8	38.3	42.7	41.4	44.8	41.6	59.6	...	
2004	42.0	38.0	42.9	41.4	44.7	41.6	60.1	65.9	
2005	43.8	39.2	44.7	43.1	46.7	43.3	61.4	64.2	
2006	43.8	39.7	44.8	43.2	46.5	43.4	63.5	63.9	
2007	43.1	39.1	44.1	42.5	45.9	42.6	63.9	66.3	
2008	43.2	38.9	44.2	42.6	45.9	42.8	64.2	67.8	
2009	43.8	39.9	44.7	43.1	46.3	43.2	64.5	67.1	
2010	43.3	39.0	44.2	42.5	45.9	42.7	63.7	69.9	
2011	43.7	39.1	44.6	42.8	46.2	43.0	63.8	67.9	
2012	44.2	39.9	45.1	43.3	46.5	43.4	63.8	68.7	
<b>Fathers</b>									
1998	1.1	0.9	1.4	1.3	1.3	1.3	17.9	...	
1999	1.3	1.0	1.7	1.5	1.5	1.5	17.0	...	
2000	1.7	1.3	2.6	2.3	2.3	2.3	16.7	...	
2001	4.6	3.9	6.6	6.2	6.3	6.2	21.2	...	
2002	5.3	4.5	7.3	6.9	7.0	6.9	22.1	...	
2003	5.6	4.9	7.9	7.5	7.7	7.5	22.6	...	
2004	6.0	5.1	8.4	8.0	8.2	8.0	22.0	9.5	
2005	6.3	5.3	8.8	8.4	8.6	8.4	20.8	15.0	
2006	5.7	4.8	7.5	7.0	7.4	7.1	26.6	20.0	
2007	5.2	4.5	6.8	6.4	6.8	6.5	27.0	26.8	
2008	4.4	3.8	5.6	5.3	5.6	5.4	27.8	28.2	
2009	3.4	3.0	4.4	4.2	4.5	4.3	31.4	30.1	
2010	3.2	2.8	4.1	3.9	4.1	3.9	30.3	29.7	
2011	2.9	2.4	3.7	3.5	3.7	3.6	28.9	29.3	
2012	2.8	2.4	3.5	3.4	3.5	3.4	28.0	25.4	

... not applicable

**Notes:** ROE: Record of Employment; EI: Employment insurance; LEAP: Longitudinal Employment Analysis Program.

**Sources:** Statistics Canada, T1 Family File and T4-ROE-LEAP linkage file, and Employment Insurance Coverage Survey.



Table 3 presents estimates of parental leave using seven different definitions of parental leave. There are several important points to take from this table. Column 1 presents the percentage of new parents who had an ROE for parental leave in the child's birth year, while Column 2 presents the percentage of new parents who received an ROE for parental leave in the child's birth year and received EI benefits in the same year. This is to ensure that those who were issued an ROE actually received EI benefits. This part of the table shows that some new parents who were issued an ROE for parental leave did not actually receive EI benefits in the same calendar year. In the child's birth year, about 10% of new mothers who were issued an ROE did not receive EI benefits (i.e., the difference between Columns 1 and 2). Thus, when the first two definitions of parental leave, 1) and 2), are used, rates of parental leave are quite low, ranging from 32% to 44% of new mothers and from 1% to 6% of new fathers. The rest of the definitions of parental leave are broader, capturing a larger set of new parents using these benefits.

The next four definitions of parental leave examine whether rates of leave-taking are higher when the definitions consider the fact that the ROE may come in the calendar year before the newborn's birth, the year of the birth, or the year after the birth. Taking into account the fact that the ROE may come in one of three years helps to decrease the discrepancy between the proportion of new parents who were issued an ROE for parental leave and the proportion who also received EI benefits. Table 3 shows that the differences between Columns 3 and 4, and between Columns 5 and 6, are smaller than those between Columns 1 and 2. In addition, considering the possibility that a new parent may receive an ROE in the year before or after the child's birth year only slightly increased the estimated parental leave rates among new parents. This is evident from the changes from Columns 1 to 3 and to Column 5, and from Columns 2 to 4 and to Column 6.

Third, Table 3 shows that all the identifications based primarily on an ROE for parental leave produced parental leave rates that were far lower than the estimated rates from the EICS, as reported in Column 8. For instance, in identification 6, 43.4% of new mothers and 3.4% of new fathers received paid parental leave in 2012, compared with 68.7% and 25.4%, respectively, estimated from the EICS. However, identifying parental leave based primarily on whether a new parent received EI benefits in the child's birth year produced parental leave rates, in Column 7, much closer to those estimated from the EICS. Depending on the year, the difference in the estimated parental leave rate between the EI-based identification and the EICS ranged from 0.4 to 6.2 percentage points for mothers, and from 0.2 to 12.5 percentage points for fathers. Part of the variation in the yearly difference between the two estimates is the result of the larger yearly variation of the EICS estimates, likely because of the EICS's relatively small sample size and consequent larger sampling variation.

Lastly, the final two identifications of parental leave, Columns 6 and 7 in Table 3, are examined. Identification 6 considers the possibility that an ROE can be issued in the child's birth year, in the year before, or in the year after, and ensures that EI benefits are received by the new parent. This is the most reasonable approach for defining parental leave based primarily on the ROE. For simplicity, it is hereafter referred to as the ROE-based definition. Identification 7 is referred to as the EI-based definition. This defines parental leave either as the parent having an ROE in the year before the birth, the year of the birth, or the year after the birth, or as the parent receiving EI benefits during the birth year. This allows for the possibility of including all new parents who received EI benefits specifically for parental leave and for other reasons. Even though not all parents in this category have received an ROE for parental leave, it is reasonable to assume that they are getting some paid EI leave through the EI program; estimated parental leave rates are similar to those found in the EICS.

Table 4 divides the EI-based definition into several situations to further show its relationship with the ROE-based definition for selected years. The ROE-based definition comprises the first two situations listed in the table. The first situation consists of new parents who were issued an ROE for parental leave in the pre-birth year, the birth year, or the post-birth year, and received EI benefits in the birth year. The second situation comprises new parents who were issued an ROE

for parental leave in the pre-birth year, the birth year, or the post-birth year, and did not receive EI benefits in the birth year, but received benefits in the post-birth year. In 2012 about 40.6% of new mothers were in the first situation, while 2.8% were in the second situation. Together, 43.4% of new mothers took parental leave, according to the ROE-based definition. For the remaining situations, where new mothers received EI benefits in 2012, 6.5% were issued an ROE for temporary leave other than parental leave, 0.9% quit the jobs they held before the leave, 2.4% were issued an ROE for reasons other than parental leave and did not go back to the same employer, and 10.5% were not issued an ROE at all. Apparently, many new mothers could receive EI benefits without an ROE.<sup>11</sup> Among new fathers who received EI benefits, a very small proportion was issued an ROE specifically for parental leave. Instead, those who took a temporary leave and returned to the same employer were the most common, followed by those who were not issued an ROE for any reason.

Table 5 further compares the estimated family-level parental leave rates from the ROE-based and EI-based definitions by key demographic characteristics. Family-level parental leave is counted using the census family as the unit and is defined as either one parent or both parents taking leave. By marital status, the difference between the two definitions was larger among common-law and lone parents than among married parents in relative terms (ratio), and largest among common-law parents in absolute terms (last column). By parents' sex, the relative difference between the two definitions was largest among male lone parents, while the absolute difference was largest among opposite-sex parents. By family income, the relative difference was largest among the two lowest income categories, while the absolute difference was largest in the second-lowest income category. By the number of children already in the family, the difference was small in relative terms, but larger among families with two or more children in absolute terms. Finally, by province, the differences between the two definitions were generally larger in the Atlantic Provinces and Quebec than in the other provinces, both in relative terms and in absolute terms.

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11. For instance, the EI program has sickness benefits for which an expectant mother can apply. The sickness benefits can provide up to 15 weeks of sick time on top of the maternity leave and the parental leave (ESDC 2016b). To qualify for the sickness benefits, an expectant mother needs a medical certificate signed by a doctor for the reason of pregnancy complications.

**Table 4****Job separation types among parents who received a Record of Employment for parental leave or received employment insurance benefits, selected years**

	1998	2000	2002	2004	2006	2008	2010	2012
	percent							
<b>Mothers</b>								
With pre-birth-year, birth-year, or post-birth-year ROE; and received EI in the birth year	33.3	34.4	38.9	38.7	40.4	39.8	39.8	40.6
With pre-birth-year, birth-year, or post-birth-year ROE; and received EI after the child's birth year	2.1	2.3	2.6	2.8	2.9	3.0	2.8	2.8
No ROE for parental leave, received EI, temporary leave	5.1	5.6	4.3	5.3	5.6	6.6	6.4	6.5
No ROE for parental leave, received EI, permanently quit	1.1	1.3	1.0	1.0	1.0	1.2	0.9	0.9
No ROE for parental leave, received EI, other permanent leave	2.3	2.4	2.3	2.4	2.4	2.5	2.4	2.4
No ROE at all, received EI	8.4	7.9	10.1	9.9	11.1	11.1	11.4	10.5
Total	52.1	53.8	59.1	60.1	63.5	64.2	63.7	63.8
<b>Fathers</b>								
With pre-birth-year, birth-year, or post-birth-year ROE; and received EI in the birth year	0.9	1.4	4.7	5.3	5.1	4.1	3.0	2.6
With pre-birth-year, birth-year, or post-birth-year ROE; and received EI after the child's birth year	0.4	0.8	2.2	2.7	2.0	1.3	0.9	0.8
No ROE for parental leave, received EI, temporary leave	9.1	7.9	7.7	7.6	13.1	16.1	18.2	18.4
No ROE for parental leave, received EI, permanently quit	1.1	1.1	1.1	1.1	1.0	1.1	1.1	0.9
No ROE for parental leave, received EI, other permanent leave	2.9	2.6	2.9	2.4	2.1	2.3	2.6	2.3
No ROE at all, received EI	3.6	2.8	3.4	2.9	3.3	3.0	4.5	3.1
Total	17.9	16.7	22.1	22.0	26.6	27.8	30.4	28.0

**Notes:** LEAP: Longitudinal Employment Analysis Program; ROE: Record of Employment; EI: Employment insurance.

**Sources:** Statistics Canada, T1 Family File and T4-ROE-LEAP linkage file.

**Table 5**  
**Estimated parental leave rates at the family level with two different definitions**

	Sample	ROE-based	EI-based	Difference between EI- and	
	size	definition	definition	ROE-based definitions	
	number	percent		ratio	percentage points
<b>Marital status</b>					
Married	2,179,467	54.1	72.3	1.3	18.2
Common law	916,691	48.9	77.6	1.6	28.7
Lone parent	508,553	28.6	44.5	1.6	15.9
<b>Parents' sex</b>					
Opposite-sex parents	3,089,827	52.5	73.8	1.4	21.3
Same-sex parents (men)	1,852	52.6	73.7	1.4	21.1
Same-sex parents (women)	4,479	62.8	83.2	1.3	20.4
Male lone parent	9,977	8.1	25.1	3.1	17.0
Female lone parent	498,576	29.0	44.9	1.5	15.9
<b>Family income in pre-birth year (2013 constant dollars)</b>					
Less than \$30,000	925,199	21.9	38.4	1.8	16.5
\$30,000 to \$59,999	868,464	43.8	72.5	1.7	28.7
\$60,000 to \$89,999	784,526	59.2	82.3	1.4	23.0
\$90,000 to \$119,999	525,228	69.6	87.3	1.3	17.7
\$120,000 to \$149,999	259,397	73.9	88.7	1.2	14.8
\$150,000 or more	241,899	69.4	82.7	1.2	13.3
<b>Number of children (pre-birth year)</b>					
0	3,452,200	48.4	68.8	1.4	20.4
1	115,774	68.0	91.1	1.3	23.1
2	30,387	62.0	86.6	1.4	24.6
3	5,179	55.8	81.4	1.5	25.6
4 or more	1,173	48.3	72.6	1.5	24.3
<b>Province or territory</b>					
Newfoundland and Labrador	63,480	31.6	62.3	2.0	30.7
Prince Edward Island	14,821	49.5	84.3	1.7	34.8
Nova Scotia	92,757	47.7	73.5	1.5	25.8
New Brunswick	77,176	46.5	77.1	1.7	30.5
Quebec	828,392	49.7	78.5	1.6	28.8
Ontario	1,354,528	52.8	68.6	1.3	15.8
Manitoba	144,359	45.7	61.6	1.3	15.9
Saskatchewan	126,468	44.5	60.5	1.4	16.0
Alberta	424,162	46.7	65.0	1.4	18.4
British Columbia	431,247	47.5	68.0	1.4	20.6
Territories	19,236	34.4	50.9	1.5	16.5

**Notes:** ROE: Record of Employment; EI: Employment insurance; LEAP: Longitudinal Employment Analysis Program.

**Sources:** Statistics Canada, T1 Family File and T4–ROE–LEAP linkage file.

## 6 Conclusion

Although several surveys collected by Statistics Canada contain information relevant to parental leave and detailed sociodemographic covariates, they are limited by the small size of their sample of new parents and by their cross-sectional nature. Longitudinal administrative data can overcome these limitations because they cover almost the entire population, have minimal attrition, and are particularly suitable for research on long-term trends and the impact of taking paid parental leave on subsequent labour market activity and family behaviours.

This report described the steps for matching the T1 Family File (T1FF) with the linkage file consisting of the T4 file, the Record of Employment (ROE) and the Longitudinal Employment Analysis Program for the purpose of estimating parental leave rates. It also identified two major issues that users should be aware of in using linked administrative data to study parental leave.

The first issue is that the coverage of newborns in the T1FF changed in 1993 and 2005 (and to a lesser extent in 2006). In particular, the coverage increase in 2005 was concentrated among upper-middle-income and high-income families. Although these families might not have qualified for the Canada Child Tax Benefit in 2005, it is possible that they applied for it anyway in anticipation of the implementation of the Universal Child Care Benefit (UCCB) in the summer of 2006. The replacement of the UCCB with the mean-tested Canada Child Benefit on July 1, 2016, would affect the identification of newborns in upper-middle-income and high-income families in the T1FF in 2016 and after. Since upper-middle-income and high-income families are more likely to take parental leave than lower-middle-income and low-income families, the ups and downs in the coverage of newborns in upper-middle-income and high-income families would lead to corresponding fluctuations in the estimated parental leave rates from administrative data.

The second issue is how to identify parental leave using information available in the administrative data. When the reason for leave indicated in the ROE is parental leave, the identification is unambiguous, but using the ROE reason alone underestimates the parental leave rate to a large extent, relative to the estimates from the annual Employment Insurance Coverage Survey (EICS). The difference between ROE-based estimates and the EICS could be due to bias in both sources. On the one hand, the EICS contains only about 1,000 new mothers and is more likely subject to sampling variability. The EICS asks respondents specifically whether they made any claim or applied for benefits with the Quebec Parental Insurance Plan (for Quebec residents), or for maternity or parental benefits with the Canadian Employment Insurance (EI) program (for the rest of Canada), and, if so, whether they receive EI benefits. However, it is possible that not all new mothers know the difference between parental benefits and other EI benefits. If they received any EI benefits before or after the childbirth, they might perceive them as parental leave benefits. On the other hand, many expectant or new mothers can receive EI benefits rather than parental leave benefits if they left their jobs because of illness, quit, or used other types of leave. When filing the ROE, some employers may not know the various reasons they can put in the form. These possibilities could all be associated with the cases of new parents not being issued an ROE for parental leave but receiving EI benefits. This likely explains why the parental leave rates estimated with the EI-based definition are close to those from the EICS.

It is reasonable to suggest that the ROE-based definition provides the lower bound of the parental leave rate. Parents who received an ROE specifically for parental leave have legal protection for their job, to which they are entitled to return. In comparison, the EI-based definition provides the upper bound of the parental leave rate. It includes parents who received financial support while taking leave from work for pregnancy or to spend time with their infant, but many of them do not have the legal job protection that an ROE for parental leave would provide. To be consistent with the annual EICS estimates, the EI-based definition can be used for broad-level analysis of trends and regional patterns. However, in studies of the determinants and impacts of parental leave, both the ROE-based definition and the EI-based definition should be used to explore possible differences and implications.

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