Child Care Use and Child Development in Immigrant, Lone Mother, Rural, and Official Language Minority Families in Canada

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ABSTRACT

Using the National Longitudinal Study of Children and Youth, the authors examine child care use patterns (type of care, hours of care, multiple use of types of care and child care expenditures) by preschool children (6 months – 5 years) of immigrant, lone mother, rural and official language minority families in Canada with a mother employed or studying. Further, they analyze the changes in types and hours of child care used between 1994-95 and 2006-7. The determinants of these child care use patterns are analyzed, with special attention to the role of membership in the four population groups of interest. The second part of the study examines determinants of child development, with special attention to the effects of child care use patterns and the differential effect of child care use patterns on children from immigrant, lone mother, rural and official language minority families.

KEY WORDS

child care, early childhood education, types of child care, hours of child care, child care expenditures, child care use patterns, multiple use of types of child care, child development, immigrant, lone mother, lone parent, rural, official language minority, preschool, population groups

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EXECUTIVE SUMMARY

This is a study about child care use patterns and child development amongst certain groups in the Canadian population. These groups – frequently ignored in other analyses - include immigrant families, lone mother families, families living in rural areas, and official language minority families (Francophone families living outside Quebec and Anglophone families living in Quebec).

Using the National Longitudinal Study of Children and Youth, the authors examine child care use patterns (type of care, hours of care, multiple use of types of care and child care expenditures) by preschool children (6 months – 5 years) of immigrant, lone mother, rural and official language minority families in Canada with a mother employed or studying. Further, they analyze the changes in types and hours of child care used between 1994-95 and 2006-7.

The determinants of these child care use patterns are analyzed, with special attention to the role of membership in the four population groups of interest. The second part of the study examines determinants of child development with special attention to the effects of child care use patterns and the differential effect of child care use patterns on children from immigrant, lone mother, rural and official language minority families.

Immigrant families are those in which at least one parent was born outside Canada; 25.6% of all preschool children who have a mother employed or studying (i.e., of all children) live in immigrant families. Lone mother families are those in which there is only one parent – the mother - currently living with the child; 11.7% of children live in lone mother families. Rural families are those who live in communities with less than 10,000 total population; 11.1% of children with employed or studying mothers live in rural families. Official language minority families include those families living in Quebec who indicate that they first spoke English as their mother tongue and continue to speak English in the home, and those families living outside Quebec who indicate that they first spoke French as their mother tongue and continue to speak French in the home; 6.4% of children live in official language minority families.

METHODOLOGY

This study models the child care decisions of families as based on a wide range of characteristics of the children, the families and the mother's employment situation. In addition, membership in one of the four population groups – immigrant, lone mother, rural and official language minority families – may affect child care decisions because of preferences or differential access to certain types of child care. We do not have information about the price, quality and convenience of different types of care available to each family; these omitted variables could potentially lead to biased estimates on population-group characteristics. Decisions about child care type and about hours of care are estimated using multinomial logits. Zero versus positive expenditures is a binomial logit and the conditional amount of child care expenditure is estimated

with Ordinary Least Squares.

This study models the child development effects of child care decisions on young children inside and outside the four population groups of interest. The levels of child development are measured on sixteen different continuous scales, which record cognitive, language, pre-math, and mathematical abilities, as well as personal and communication skills and general motor and social development. Other of these sixteen scales measure emotional, behavioural and health development of children.

The effect of different factors on child development are estimated using Ordinary Least Squares. A wide range of child, family and mother's employment characteristics are included in regressions; this reduces the probability that child care's effects are estimated with bias due to selectivity. Our focus in these child development regressions is on the effects of variations in the type, hours and multiple use of types of child care on the development of children. Our regressions include these variables, variables indicating population-group membership, and variables that capture the distinct effects of child care type, hours and multiple types on children from immigrant, lone mother, rural and official language minority families.

RESULTS

Over 40% of children in Canada that have employed or studying mothers now use regulated child care as their primary type of child care. Another 30% use parental care while the mother is employed. The use of unregulated care by a non-relative or by a relative comprises the remaining 30% of care. Perhaps surprisingly, immigrant, lone mother, rural and official language minority families also are most likely to use regulated care as their primary type of child care.

Substantial numbers of families spend more than $100 per week on child care per child. This includes about 35% of immigrant families who use non-parental care and about 30% of official language minority families using non-parental child care. The average child care expenditure across all families who have positive expenditures is about $100 per week.

The increase in the use of regulated child care since the NLSCY began collecting data in 1994-95 has been dramatic, and it has similarly affected the child care use patterns of all four population groups of interest. Broadly speaking, the percentage of immigrant, rural and official language minority families using regulated care has doubled over this 12-year period. For lone mother families, regulated child care use has risen by 14 percentage points to include over half of all children in lone mother families with an employed or studying mother. Although Quebec's $7 per day regulated child care has dramatically increased the use of regulated child care in that province, there have been substantial increases in the percentage of these population-group families using regulated care in the rest of Canada as well. Use of unregulated care by a non-relative has declined dramatically over this period. Use of care by a relative has increased moderately and use of care exclusively by parents has declined over this 12-year

period.

Considering main effects, regulated child care has a pattern of desirable effects on children's development across sixteen child outcomes. This is true of both cognitive and emotional/behavioural outcomes. Using unregulated care by a non-relative has a mix of positive and negative effects on cognitive outcomes, with positive or null effects on emotional/behavioural outcomes. Using unregulated care by a relative has a positive effect on personal skills at age 2-3, but otherwise has no significant positive or negative effects on cognitive, language, pre-math and math, or general development measures. There are desirable effects on two measures of behaviour (and no undesirable effects).

Longer hours of child care in a week do not have widespread effects on child development. The number of individual types of child care used in a week has undesirable effects on math scores in Grades 2 and 3, on emotional disorder at ages 4-7 and on indirect aggression at ages 4-7, but no significant effects on other child outcomes.

In addition to these main effects, child care use has a diverse mix of interaction effects, sometimes positive and sometimes negative, on children in immigrant, lone mother, rural and official language minority families.

CONCLUSIONS

On the one hand, the conventional wisdom about the use of child care by immigrant, lone mother, rural and official language minority families is correct. In other words, in comparison to other families, immigrant and rural families are disproportionately likely to use parental care and care by relatives; lone mothers are disproportionately likely to use regulated child care; official language minority families are disproportionately likely to use unregulated care by a non-relative.

On the other hand, the pattern of child care use by these population groups is broadly very similar to that of other Canadian families, with regulated care being the choice of the plurality of each group, and parental care being next most frequent. Further, the direction of change (substantial increased use of regulated care) over the 12-year period from 1994-95 has been identical across population groups and other Canadian families.

There is evidence that an important proportion of Canadian families, both within these four population groups and outside of them, are not using the type of child care they would most prefer and that costs and availability are important barriers to fulfilling their preferences. We have found that those families who do pay for non-parental child care pay an average of nearly $100 per week for the care of each child. However, this study does not focus on trying to estimate hardship, dissatisfaction, or barriers to fulfillment of child care preferences for immigrant, lone mother, rural and official language minority families.

This study finds generally positive main child development effects of using regulated child care and mixed effects of using other types of child care. There is

a diverse pattern of interaction effects between child care use and child development for the four population groups, with variation by population group, type of care, and by child development measure.

It is appropriate to be modest about the findings of this study that relate to the links between child care and child development. The generally positive main findings, particularly for regulated care, differ from some other Canadian studies using the NLSCY, and we have not yet had the opportunity to identify the source of these different results. It is not reasonable to conclude that the child care effects on child development identified in this study are necessarily causal. We have not been able to control for variations in the quality of child care services used, although the literature review identifies this as the major aspect of child care that is expected to influence child development. Further, some of the interaction effects, and even main effects, that we have found, may be partially due to quality-related selection effects associated with particular population groups.

DIRECTIONS FOR FUTURE RESEARCH

Little academic and empirical research attention has been directed at child care use patterns and child development for immigrant, rural and official language minority families. Even for lone mother families, the research attention has been insufficient. This study should, appropriately, be the beginning of such a research agenda rather than the end.

Amongst other things, it would make sense to push farther the empirical investigation this paper has started. There is important heterogeneity in each of the population groups we have studied (e.g., immigrants from different parts of the world, never-married versus widowed/separated/divorced lone mothers). Both in studying child care use patterns and links with child development, exploring this heterogeneity would add valuable explanatory power. This paper has not explored the possible use of NLSCY information to get proxy measures for price or quality, which could make more plausibly causal the study of both child care use patterns and links with child development. Similarly, this paper has largely ignored NLSCY data on parental satisfaction and subjective information on factors affecting choice. This, along with further exploration of the material on child care preferences, could yield more policy-relevant conclusions.

Finally, this paper has broken new territory in the investigation of the links between the child care use by immigrant, lone mother, rural and official language minority families and the child outcomes that result. Empirical results will be more plausibly causal if they include proxies for quality variations and if they include better controls for prior child ability and explicit parental investments. It would make sense to use this opportunity to push this research agenda forward.

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1. Introduction

This is a study about child care use patterns and child development amongst certain groups in the Canadian population. These groups – frequently ignored in other analyses - include immigrant families, lone mother families, families living in rural areas, and official language minority families (Francophone families living outside Quebec and Anglophone families living in Quebec).

We consider child care use by preschool children[1] (6 months of age up till entry to first grade). Due to data availability, unless explicitly noted all of our analyses include only families in which the mother is employed or studying. For convenience of terminology in this paper, we may refer to the total number of preschool children in Canada having a mother employed or studying as the "overall population of children" or "all children". Within the context of this paper, that terminology should not be confusing, but it could be confusing if excerpts from this report were taken out of context.

Immigrant families are those in which at least one parent was born outside Canada; 25.6% of all preschool children who have a mother employed or studying (i.e., of all children) live in immigrant families. Lone mother families are those in which there is only one parent – the mother - currently living with the child; 11.7% of the overall population of children live in lone mother families. Rural families are those who live in communities with less than 10,000 total population; 11.1% of all children live in rural families. Official language minority families include those families living in Quebec who indicate that they first spoke English as their mother tongue and continue to speak English in the home, and those families living outside Quebec who indicate that they first spoke French as their mother tongue and continue to speak French in the home; 6.4% of all children (i.e., of all children with mother employed or studying) live in official language minority families.

The principal research questions to be addressed are:

1. What types of child care are used by preschool children in these population groups, and how do these use patterns differ from those of the general population of preschool children in Canada? Further, how do these patterns of child care use vary by the age of the child?

2. What have been the main changes to or trends in use patterns of child care in these different population groups over time, and how do these trends compare to that of the general population of preschool children in Canada?

[1] The term "preschool children" is used in this report to refer to children who are younger than school-entry age. In practice, since the National Longitudinal Study of Children and Youth (NLSCY) has a very small sample of children less than six months of age, preschool children in this paper range from six months of age to five years of age and not yet in Grade One. This note is necessary because the term "preschool children" is, in some other literature, used to denote children 3–5 years of age inclusive, as distinct from infants and toddlers who are younger.

3. What are the key factors associated with the use of different types of child care and different amounts of hours of child care by children in these population groups? Do these factors vary by the age of the child, and how?

4. What are the relationships between the type (or hours) of child care used and certain developmental outcomes for children in these population groups? How do these relationships compare to those found in the general population of preschool children in Canada? These developmental outcomes would include measures of health, cognitive development, behavioural, social and emotional development.

Child care is, for this paper, defined as regular nonparental or exclusively parental care of children while the mother[2] is occupied in paid employment or as a student. Kindergarten is not, for the purposes of this paper, considered to be a form of child care[3], and, naturally, school is not a form of child care.

We consider four types of child care: *regulated care:* formal licensed child care (whether provided in a centre or in a regulated family home); *unregulated care by a non-relative:* informal, unregulated, child care provided by a person unrelated to the child; *care by a relative:* regular child care provided inside or outside the child's home by a relative of the child (but not by the father); *parental care[4]:* care provided by the parents of the child (by either the mother or the father while the mother is employed or studying).

The "primary" type of child care that the child uses is, in general, defined as the type of care used for the largest number of hours per week. However, in the NLSCY (National Longitudinal Survey of Children and Youth), which is the main data set used, a child is categorized as using parental care (while the mother is employed or studying) only if the child "exclusively" uses parental care.

This study will employ data from three data sets. Nearly all of the analyses are based on the National Longitudinal Survey of Children and Youth (NLSCY) which

[2] The NLSCY identifies a PMK (person most knowledgeable about the child). It would therefore be possible to define "child care" as regular nonparental or parental care of children while the PMK is occupied in paid employment or as a student. Although about 95% of PMK's are women, this alternative definition would appear to be more gender-neutral, allowing for the possibility that the father is the main caregiver of the child. However, there is evidence in the NLSCY that when the PMK is not the mother, this generally does not indicate that the father is truly the main caregiver, but rather that the mother does not have sufficient time to answer the survey. It may, therefore, be more misleading than enlightening to define child care with respect to the activity of PMK's as opposed to with respect to the activity of mothers.

[3] See Cleveland, Forer, Japel, Hyatt and Krashinsky (2008) for a recent study of Canadian child care use that includes kindergarten as a form of child care.

[4] Parental care while the mother is working or studying generally takes one of three forms: care by parents while they are on maternity/parental leave (a parent on parental leave is counted as employed), care by the mother while she is employed (often self-employed) and working out of her own house, and "off-shifting" - care by the father while the mother is employed (often part-time) on a shift that is different from the father's shift.

is a large and rich data set for analyzing both child care use and links with child development; it is virtually the only cross-country data set that can be used to analyze both of these topics. All seven Cycles (1994-95 to 2006-07) of the NLSCY will be utilized. Child care expenditure data is available only in Cycle 7. The 1988 Canadian National Child Care Survey (CNCCS), although dated, is useful for confirmation of expenditure patterns. The Survey of Household Spending (SHS) provides data on family expenditures on child care from previous years - a check on the data on child care expenditure patterns that is newly available in Cycle 7 of the NLSCY. The SHS has been the only continuing source of data on child care expenditure patterns before the recent addition of such questions in the NLSCY.

The next chapter (Chapter 2) provides a review of relevant literatures on child care use and the links between child care and child development, with special attention to evidence related to the four population groups of interest, and to Canadian studies.

Chapter 3 describes the essential patterns of use of child care by the four population groups in comparison to the general population; this examination includes type of care, hours of care, multiple use of types of care and weekly expenditures on child care. Chapter 3 also compares recent patterns of child care use (type and hours) by the four population groups to past patterns, and does the same comparison for the child population as a whole. Finally, Chapter 3 explores the potential determinants of the observed patterns of child care use in the four population groups and in the child population as a whole. There are regression analyses of factors associated with the type of child care used, with the hours of child care used and with parental expenditures on child care. For all of the four population groups, there are significant differences found in use patterns, in comparison to the general child population. There are a few tables looking at the gross cross-tabular relationships between different variables (e.g., mother's education, household income) and the patterns of child care use. These have been placed in Appendix B.

Chapter 4 explores the role of potential determinants of child development. The NLSCY includes a large number of indicators of child development – cognitive, social, emotional, behavioural and physical; this chapter includes regression analysis of factors associated with sixteen indicators of child development. There are a large number of potential determinants of the level of development measured by these indicators of child development; this chapter measures the effects of a wide range of child and family variables. In particular, we consider the impact on child development of being a member of one of our four population groups. We measure the impact on child development of a number of child care variables (type, hours and multiple use) and the distinct effects of these child care variables for each one of the population groups, holding constant a considerable number of child, mother and family characteristics.

Chapter 5 provides a summary, discussion of data limitations, suggestions for

future research in this area, and conclusions for the study as a whole. In the "References" section, detailed references are provided for all of the literature mentioned in this paper.

Appendix A provides definitions of key dependent and independent variables. Appendix B provides a number of cross-tabulations between potential determinants of child care use patterns and those patterns for each of the four population groups. Also included are some cross-tabulations on the change in these child care use patterns between the 1990's and the 2000's. Materials in these latter two appendices support and amplify the analysis in Chapter 3.

2. Literature Review

This literature review will summarize findings from a number of different literatures under the following headings: child care use patterns; child care expenditures; and child care and child development

Child Care Use Patterns

In theory, we would expect several factors to affect parental decisions about child care, many of them being associated with either preferences (different views about what is appropriate for children), or constraints (the amounts of income and parental time that a family has available and the relative prices of different types of care). Different demographic variables, such as education, immigrant status, and the age of the child are correlated with preferences, and influence family decisions about the use of child care. Father's income and mother's income constrain expenditures on child care; since the mother's decision to be employed frequently triggers the decision to use non-maternal child care, her income may have a larger effect. Different measures of the mother's employment status, such as hours of work per week, type of shift worked, whether the mother works at home will reflect parental time constraints.

The price of child care is an important determinant of use patterns; however, this is not just a money price. For instance, even if a relative does not charge for providing care, her time has value (the opportunity cost of that relative's time). If the relative has good education and work skills, the alternative value of her time will be high. If the relative has a modest education level and few Canadian-relevant work skills or experience, then the price of care by a relative will be low for that family. The same logic applies to care exclusively by parents; the true underlying price of this type of care will depend on the opportunity cost of the time taken from the father or mother to provide this care. The prices of regulated care and unregulated care by a non-relative are more straightforward; they are (mostly) explicit money prices. Eligibility for child care subsidy will change the potential price of regulated care for many low or low-middle income families, especially lone mother families.

Even once prices, incomes and other demographic variables are controlled, we may expect that living in a rural area, being a single parent, or having an immigrant or official language minority background may affect child care decisions through differences in parental preferences or differences in the characteristics and availability of different types of care.

There have been a number of general studies (i.e., not focusing on particular sub-populations) of the demand for child care or the patterns of child care use in Canada, the United States and other countries. It is useful to review this empirical evidence about the key factors that affect child care use patterns, in particular noting any evidence related to the four population groups of special interest for this study. These studies will also provide some guidance on

empirical methodology.

General Studies from the U.S. and Canada

Hofferth and Wissoker (1992; but see also the revision published in 1996) and Hofferth, Chaplin, Wissoker and Robins (1996) are two relatively recent U.S. studies of the demand for different types (or modes) of child care by families having a mother employed or studying. The samples and specifications in these studies are similar to the one used in this study; they provide a model for regression analysis of the factors determining the types of child care used by families in Canada.

These U.S. studies analyze the factors affecting parental choice amongst four child care modes for preschool children: centre care, care by an unrelated sitter, care by a relative and care provided by the father while the mother is occupied. Families in which the mother cared for the child while employed or studying were dropped from the analysis.

The variables affecting the patterns of child care use can be summarized in four categories: the characteristics of the care arrangements (including price, quality and availability or distance), family resources (mother's wage rate and other family income), mother's employment characteristics (hours of work and non-standard work hours), and factors affecting preferences (child's age, number of siblings by age category, ethnic/racial background of parents, mother's education, marital status, and region).

The findings (Hofferth and Wissoker, 1992; Hofferth et al., 1996) correspond fairly closely to expectations. The price of each mode of child care has a negative effect on the probability of use, and increased availability (or decreased travel time) has a strong positive effect. The pattern of effects of quality is not consistent, but the only available measure of quality was child-staff ratio, an obviously imperfect measure. Higher child-staff ratio is positively correlated with the use of centre care. Other family income and the mother's wage both tend to increase the probability of using either centre or sitter care, rather than care by a relative or by the father. Mother's education, is associated with the use of centre care, as is coming from a Black or Hispanic background. Having a non-day job increases the probability that a child will use care by a relative or the father. Being a lone mother increases the probability of using care by a centre.

EMPLOYMENT AND CHILD CARE USE

Connelly and Kimmel (2003) and Davis and Connelly (2005) estimate variations on the child care choice models described above. Connelly and Kimmel model both the effect of child care prices on mothers' employment decisions and the decision of employed mothers about what mode of child care to use. Decisions by married and single mothers are analyzed separately. They find that a higher probability of being employed full-time rather than part-time has a strong positive effect on the use of centre care for both single and married mothers. Child care prices have expected (negative) effects on care choice. Increased child age is associated with more use of centre care and increased number of children in the

family is associated with decreased use of care by relatives. In general, factors associated with greater availability of centre care or relative care increase the probability of using that form of care.

Davis and Connelly (2005) look at child care decisions of both employed and not currently employed mothers (nearly one-quarter of families with mothers not employed use non-parental care for more than 5 hours per week). Looking at the care of the youngest child in the household (less than 5 years of age), they find that centre care is strongly and positively associated with child age and with family income. If a mother works non-standard hours, the use of centre care is less likely. Price (non-relative care) and availability (relative care) are only significant for the use of some types of care; the authors conclude that families make a series of trade-offs in deciding on a type of care to use.

Blau and Currie (2004) is a recent U.S. study that reviews cross-tabular evidence about the patterns of child care use in that country. They find that race/ethnicity affects the type of child care used; Black children are likely to be cared for by relatives or in centres, but less likely than White children to be in non-relative care. Hispanic children are very likely to be cared for by relatives. Urban and rural children are found to have similar patterns of child care choice. Blau and Currie find evidence that centre care in the U.S. continues to be used by the rich and the poor, but much less by middle-income families.

CANADIAN EVIDENCE

There are two recent Canadian studies of factors affecting child care use patterns. The first, by Bushnik (2006) uses various cycles of the NLSCY up to and including Cycle 5 (2002-3) to examine child care use patterns in Canada with cross-tabular analysis . Her study reports child care use both by families in which (all) parents are employed and studying and by families in which one or both parents is not currently employed for pay or studying.[5] Bushnik categorizes child care use into seven types (six non-parental types plus parent-only care).

Bushnik finds that 54% of children in Canada 6 months to 5 years of age, inclusive, use non-parental child care. This is a substantial increase from 42%, 8 years previously. In a conclusion relevant for our study, Bushnik observes that "The rise in rates [of non-parental care] occurred for children from almost all backgrounds regardless of geographic location, household income, family structure, parental employment status or parental place of birth." (p. 6, Executive Summary).

In particular, Bushnik finds that the overall amount of use of nonparental care is similar for rural and urban children but that rural children are more likely to be cared for by a relative outside the child's home than urban children, and less

[5] Bushnik (2006) believes that NLSCY child care use data are valid for families in which one or more parents are not employed or studying in spite of the wording of the relevant NLSCY questions that refer to child care use while parents are working or studying. We disagree as indicated below.

likely to be cared for in a day care centre. She finds that children from lone parent families are more likely to use nonparental types of child care (especially centre care) than those from two parent families.

Bushnik also finds that, in immigrant families, a child is much more likely to be cared for by a relative at the child's home than in non-immigrant families. Immigrant children are much less likely to use care outside the home by a non-relative. Bushnik notes that immigrant families are also much more likely to have an additional adult living in the home, along with the child's parents.

A *Choices* study for the Institute for Research on Public Policy (IRPP) by Cleveland, Forer, Hyatt, Japel, and Krashinsky (2008) uses the NLSCY, but also five other data sets, to empirically compose an overall picture of the use, expenditure patterns and quality of child care in Canada. The focus, because of data availability, is on children having employed and studying parents, but there is some evidence provided about child care use in families where at least one parent is not currently employed. There are a couple of major data differences between the 2008 study and this one. The 2008 IRPP study included use of kindergarten for 4 and 5 year old children as a form of regulated care (so that if kindergarten were used for more hours per week than any other form of care, the child would be categorized as using regulated care as the primary type of child care). Further, the most recent child care use data for the IRPP study was 2004-5 (Cycle 6 of the NLSCY), whereas this study for HRSDC includes data from 2006-7 (Cycle 7 of the NLSCY). And, of course, this study focuses on four distinct population groups, rather than on the overall preschool population.

Cleveland et al (2008) find that, with kindergarten included as a form of regulated care, about 49% of preschool children of employed or studying mothers in Canada use regulated care as their primary type of child care. About 15% use non-relative care; 15% use care by relatives and 22% use exclusively care by parents. Use of regulated care tripled in Quebec over a decade and doubled in the rest of Canada.

A regression analysis of the determinants of the use of regulated care found that child's age, the number of working hours of the mother, single parent status, university education of the mother, mother's annual income and living in a large urban area (over 500,000 population) all had a positive relationship to the use of regulated care. The number of children in the family and being the youngest child in the family had a negative relationship to the use of regulated care. This regression included only children from provinces other than Quebec.

Studies of Child Care Use by Immigrant, Lone Mother, Rural and Official Language Minority Families

There are a small number of studies that concentrate on analyzing patterns of child care use by the specific population groups relevant to this study. This

section reviews the findings of these studies.

IMMIGRANT FAMILIES

Brandon (2002) is an empirical U.S. study using data from the Survey of Income and Program Participation from 1989-98 to study child care in immigrant families. It considers preschool children with employed mothers. Brandon finds that similar percentages of immigrant and non-immigrant families use nonparental care (about 76%). However, child care arrangements vary by immigrant generational status (i.e, first-generation, second-generation), as well as national status (country of origin) and poverty status.

Children in immigrant families are less likely to use centre-based care than other families. In fact, kin care (care by relatives, not including the father) is the most common child care arrangement in immigrant families. In particular, families of Mexican origin or descent in the U.S. are far less likely to use centre-based care than other families.

Chiswick and DebBurman (2006) finds rather different patterns of child care use for immigrant families in the U.S., perhaps because of the concentration on older preschool children. Using 1990 Census data, the authors examine the use of centre-based preschool (including child care centres, preschools, nursery schools, Head Start and kindergarten) by immigrant families in the U.S. having children 3-5 years of age. In cross-sectional analysis, the study finds little aggregate difference in preschool enrollment by first or second generation immigrant children compared to U.S. born children, but there are substantial differences in enrollment amongst first-generation children by country of origin. For instance, over 60% of immigrant children from English-speaking countries, northern and western European countries or from Cuba attend preschool, but less than 40% of children from Mexico, the Caribbean and the Middle East go to preschool (for an overall average of 42%).

However, a probit analysis of preschool attendance finds that, all else equal, children from first and second generation immigrant families are more likely to attend preschool (i.e., centre care) than U.S. born children (controlling for country of origin). The reference (U.S.-born) child has a 38% probability, first generation immigrants have a 48% probability, and second generation children have a 42% probability of being in centre care. “Other variables held constant, both first-generation and second-generation [immigrant] children are 5-10 percentage points more likely to be enrolled in pre-school than their native-parentage counterparts.” (p. 80). However, there is substantial variation by country of origin.

Robert Crosnoe (2007), in a study using data from the Early Childhood Longitudinal Study – Kindergarten Cohort (ECLS-K), finds that children from Mexican immigrant families are disproportionately likely to be in parental care and unlikely to be in centre-based care.

LONE MOTHER FAMILIES

Cleveland and Hyatt (1996) focuses on the preschool children of lone mothers, including child care use patterns, expenditures on child care and the effects of the price of child care on the employment decisions of lone mothers. Analyzing data from the 1988 Canadian National Child Care Survey, their central conclusion is that lone mothers' employment decisions are very sensitive to price, expected wages and the level of social assistance benefits. This paper includes a useful review of other studies on child care and employment of lone mothers.

About one-half of lone mothers with children less than 6 years of age are never-married (much higher than for lone mothers as a whole). Often, a lone mother family is a transitional family type. Only just over one-third are currently employed. A disproportionate number are under 25. Most employed lone mothers use market (paid) child care, especially licenced care (38.9% use licenced care vs. 15.5% of mothers in two-parent families).

Use of licenced care rises with child age (up to but not including age 5). Whitecollar workers are more likely to use licenced care (46% vs 24% for blue collar lone mothers). Subsidy dramatically affects child care use. The proportion of lone mothers spending over $50 per week on child care is directly and strongly related to annual income.

RURAL FAMILIES

Betty A. Beach (1995) summarizes U.S. studies on child care use in rural areas. Beach writes that there are many nostalgic myths about rural life - free of stress and strain, good place to raise children, stronger family and community bonds. But demographic data also show poverty in rural areas equal to poverty in central cities. There is chronic underemployment and large amounts of purely seasonal work for parents. Mother-only families are more likely to be in poverty if they live in a rural area. There is strong economic disadvantage for minority families living in rural areas. Both of these halves of the rural reality affect the patterns of child care use.

Beach notes that comparisons across studies are particularly difficult because of the tremendous variation in the definition of "rural" across studies. For instance, "nonmetropolitan areas" often replaces rural in U.S. studies, allowing up to 50,000 in towns or settlements called rural.

Despite difficulties of comparison, there are some broad generalizations that can be made. For instance, centre-based care is far less available in rural than in urban/suburban areas. A greater proportion of the centre care that does exist in rural areas is subsidized (i.e., for disadvantaged families). Further, the quality of child care in rural centres is generally lower than in urban areas, but also the fees charged are lower.

Clearly, according to Beach's review, the preferred type of child care in rural areas is home-based day care (i.e., friends, neighbours, relatives). And there is good evidence that parenting values differ between urban and rural families.

However, it is unclear how much of the observed differences in child care use patterns between urban and rural communities is due to preference, how much to lack of alternatives, and how much is due to convenience.

We can observe, Beach writes, that there is generally more stability in caregiving arrangements in rural communities; often there are close personal relationships between parents and caregivers in rural environments. Further, apparently due to lower incomes, there is more parent-only care when parents are employed in rural areas. This is accomplished by mother and father off-shifting and by work at home arrangements.

OFFICIAL LANGUAGE MINORITY FAMILIES

The child care choices of official language minority families have not been the subject of academic study. However, there has been concern (Chaput, 2007; Standing Committee on Official Languages, 2009) about access of French-speaking families outside Quebec to child care and preschool services in French. Currently, HRSDC is sponsoring a pilot project to obtain evidence about the benefits of enriched child care services in French for children living in a minority language community.

Child Care Expenditures

There are a handful of economic studies on child care expenditure. Brayfield and Hofferth (1995), analyzing data from the US National Child Care Survey of 1990, find that it is economic factors, particularly those associated with the mother, that largely determine who pays for care, how much they pay and the share of earnings spent on care. "[I]t is out-of-pocket costs of care, mother's wage and family income that will determine what type and quality of care is purchased" (p. 175).

Phipps and Burton (1998), using data from the Statistics Canada Family Expenditure Survey of 1992, find that families pool their incomes in deciding on some but not all categories of household consumption. Expenditures on child care are found to increase only with women's incomes – higher male income is not associated with higher expenditure on child care even when both spouses work full-time, full-year. "Anecdotal evidence indicates that many couples 'net out' the costs of child care from the wife's earnings in deciding whether it is 'worthwhile' for her to take a paid job. Child care seems still to be regarded as very much a woman's responsibility. Our results confirm such ideas. Apparently, women can only 'afford' to work for low wages if they have 'free' child care from a parent or neighbour." (Phipps and Burton 1998, 609-10)

Rosenbaum and Ruhm (2005) use the 1996 US Survey of Income and Program Participation to study the "cost burden" of child care, defined as child care expenses divided by after-tax income. There is wide variation in the cost burden across families, but it is not systematically related to a measure of socio-economic status that they construct, largely because lower-income families use lower-cost types of care and pay less than higher-income families for the care

arrangements they make. Rosenbaum and Ruhm do not examine the relationship between mother's predicted income and child care spending, and they are not able to control for the quality of child care used by different income groupings nor the "cost" burden of care provided by parents and relatives.

A RECENT CANADIAN STUDY

Cleveland, Forer, Hyatt, Japel and Krashinsky (2008) analyze child care expenditures by Canadian families with preschool children and a working mother. They find that recent immigrants are more likely to spend zero on child care, and earlier immigrants (15 years earlier) are more likely to spend zero on child care if they do not speak English or French. Single parent status, all else constant, reduces the probability that the family will spend zero on child care. However, single parents who spend some positive amount on child care will spend less, on average, than other families. Families living in rural areas are considerably more likely to spend zero on child care and rural families who do spend a positive amount will be likely to spend much less.

This study (Cleveland et al., 2008) finds that families with an employed or studying mother and preschool children may spend nothing on child care, or a little, or a substantial amount. In fact, 4 out of 10 such families in Canada outside Quebec do not have annual child care expenditures. Another 3 out of 10 spend less than $3,000, while a final 3 out of 10 spend more than $3,000.

Accounting for inflation, those who do spend on child care are now spending much more than they did 20 years ago; average spending has risen from $2,600 to nearly $4,500 annually. In a typical year, this is between 20 percent and 30 percent of the mother's gross earnings, or about 8 percent of the family's total earnings.

Looking at cross-tabulations or using regression analysis, the study by Cleveland and his associates finds that economic and work situations dramatically influence family decisions about child care spending. In particular, working at home, working part-time and working shifts are associated with lower child care expenditures, while the mother's ability to earn an income has a strong positive association with child care spending. This is consistent with Phipps and Burton (1998), who found that Canadian families do not pool their incomes to pay for child care and that child care expenditures depend largely on the mother's earnings.

Care provided by a parent (and often by a relative) is free of charge, as is kindergarten for eligible children four or five years of age. Being on maternity leave, working at home, working part-time and working shifts are all strongly predictive of the use of zero-priced care. Being a recent immigrant or an immigrant whose mother tongue is not English or French is also often associated with zero-priced care. On the other hand, being able to earn a higher wage (in the case of a mother) and being a single parent are negatively associated with zero-priced care.

According to Cleveland and his colleagues, the strong associations between economic variables and child care spending suggest that affordability of care constrains the child care decisions of employed parents. Further, the importance of mothers' earnings and mothers' work variables suggests that, in many families, child care affordability involves a comparison between the mother's potential earnings and out-of-pocket child care costs. The dramatic changes in child care use patterns (and employment patterns) in Quebec following the child care and family policy reforms of 1997-2001 also strongly suggest that child care use and spending patterns in the rest of Canada are not driven purely by preference but represent difficult employment and child care decisions constrained by the affordability of care.

Child Care and Child Development

Parents seek to do the best they can in bringing up their children and ensuring that they become happy, well-rounded, well-behaved and capable. Many factors affect the development of children, but broadly we can say that children's development is affected both by their inherent abilities and initial characteristics and by the cumulative amount and types of experiences these children have as they grow up. It is now common to describe what parents do as "investing" in their children; these investments change and enrich the experiences that children have. Investments can be investments of parental time, or investments that require parental money, and often combinations of both. Parents often spend a considerable amount of money purchasing early childhood education and care services for their young children during parental work hours. Alternatively, they will spend considerable amounts of scarce parental and family time providing child care themselves to permit the earning of income.

Children's development in the early years occurs in biological, cognitive and socioemotional domains. All of these domains contribute to the early learning abilities of the child. Progress does not occur uniformly across these domains, so impacts on each one, particularly cognitive and socioemotional domains, need to be considered separately.

The pace of development of children in their preschool years is amazingly rapid, whichever aspect of development we consider: linguistic, cognitive, emotional, social, behavioural, or moral. By the time children reach school, there are striking disparities among them according to different markers of development and these disparities are associated with differences in these children's circumstances and experiences in the early years.

Furthermore, these differences among children are strongly predictive of future academic and life performance. There is evidence showing that wide individual differences at school entry in vocabulary and other early literacy skills are seldom reduced as children move through school and they can be exacerbated (Hess et al., 1984). In particular, children's cognitive skills before they enter kindergarten

show strong associations with achievement in elementary school, high school and during early adulthood; preschool general cognitive ability has been shown to predict high school completion.

There are multiple interacting determinants of the development of any child. The characteristics of the child matter (temperament, abilities, disabling conditions). Institutions in the immediate environment of the child matter (family, child care, peers). The characteristics of the broader neighbourhood and social environment also matter (neighbourhood, city, government policies, culture). Child care, therefore, interacts in complex ways with numerous factors to affect child development.

In reviewing this literature, first, we will discuss a number of recent studies that explore different methodological approaches to the empirical analysis of the effects of child care on child development. Then, we will discuss findings on the effects of child care on children under three broad categories: quality of care, type of care, and amount of care. Finally, we will pay particular attention to reviewing other Canadian studies using the NLSCY.

Methodological Approaches in Recent Studies of Child Care and Child Development

ESTIMATION MODELS

A number of recent studies of developmental effects attributable to child care provide important guidance to methodology (Blau, 1999; NICHD and Duncan, 2003; Magnuson, Ruhm and Waldfogel, 2003; but see also extensions by Keane and Bernal, 2010; Todd and Wolpin, 2006; Cunha, Heckman and Schennach, 2010). Each uses a large data set with data on the child outcomes of a large number of preschool children who have used different child care arrangements and have different child and family characteristics and home situations.

The theoretical approach taken by all of these studies is a human capital or "investing in children" approach, broadly similar to that outlined in the paragraphs immediately above.

The estimating equation used by NICHD and Duncan (2003) is:

$$\mathbf{Y_{it}} = \alpha_1 + \beta_{1E}\mathbf{CARE_{iE}} + \beta_{2E}\mathbf{HOME_{iE}} + \beta_{1L}\mathbf{CARE_{iL}} + \beta_{2L}\mathbf{HOME_{iL}} + \beta_3\mathbf{CHILD_i} + \beta_4\mathbf{FAM_i} + \mathbf{e_{it}}$$

In this equation, Y is the child outcome variable of interest and the subscripts "i" and "t" refer to child i and time period t, respectively. CARE is a set (i.e., a vector) of variables describing the child care inputs into the child's development, and HOME is a set of home-based inputs into the child's development. Both of CARE and HOME appear twice because these inputs might be made at different times during a child's early life before time period t (E = early, L = late). Then there are child characteristics (CHILD) and family characteristics (FAM). These are assumed to be continuing effects that are time-invariant. "e" is the error term.

Bernal and Keane (2010) presents a slightly different estimating equation that emphasizes goods inputs, presents a slightly different motivation for the X variables and the error term and presumes a log-linear relationship between outcomes and inputs.

$$\ln S_{ijt} = \alpha_1 T_{ijt} + \alpha_1 C_{ijt} + \alpha_1 G_{ijt} + \alpha_1 X_{ij} t + \mu_j + \delta_{ij} + \varepsilon_{ijt}$$

In this equation, "ln S" is the natural log of the child development outcome, and subscripts "i", "j" and "t" refer to the ith child, the jth family, and time period t. T (i.e., capital T) refers to the mother's time inputs, C refers to nonmaternal time inputs (e.g., child care), G refers to goods inputs and X refers to variables correlated with the child's initial skill endowment or ability. The first two components of the error function are family and child effects picking up the unobserved skill endowment of the child.

Cunha, Heckman and Schennach (2010) propose a slightly different human capital approach, captured in the equation below:

$$\theta_{k,\, t+1} = f_{k,s}(\theta_t,\ I_{k,t},\ \theta_p,\ \eta_{k,t})$$

$\theta_{k,\, t+1}$ is the measured level of skill k for a particular child, measured in time period t+1. "$f_{k,s}$()" is a production function for skill k at stage of development s, with the bracket containing key arguments in the function. θ_t refers to the skill level of the child in period t, but not only skill k; instead, θ_t refers to a vector of skills, including both cognitive and non-cognitive skills. $I_{k,t}$ refers to parental investments in skill k in time period t (which would include purchased child care, amongst other investments of money and time). θ_p refers to the skills of the parents and is a vector of different types of skills. $\eta_{k,t}$ refers to a shock to the production process affecting the production of skill k in period t.

Cunha, Heckman and Schennach are seeking to estimate the technology of skill formation in children, for both cognitive and non-cognitive skills. The equation tells us that skill k in period t+1 is a function of (1) the set of both cognitive and non-cognitive skills held by that child in the previous period, (2) the set of time and money investments in improving skill k made by parents in the previous period, (3) the time-invariant set of cognitive and non-cognitive skills held by parents and (4) shocks to this skill formation process experienced by the child/family in period t. Two particular innovations in their approach are the presumption that the production function will vary according to the stage of development of the child (i.e., a role for the concept of stages of development) and the presumption that non-cognitive skills held at time t affect the ability to accumulate additional cognitive skills by period t+1 (and vice versa). In other words, the stock of all skills held at a certain period affects the ability to accumulate more of any skill in the next period (i.e., a recognition of the importance of the current stock of non-cognitive skills in explaining children's cognitive development).

SELECTION EFFECTS

The main empirical difficulty faced by all scientists trying to estimate the effects of child care on children is accounting appropriately for "selection effects". Instead of child care treatments being randomly assigned to different children, families choose ("select") the child care inputs their child will receive. To use the notation of NICHD and Duncan (2003), we could say that the type, quality, hours etc. of the child care inputs chosen for the child will be correlated with HOME (home inputs to the child's development in this period), CHILD (child characteristics) and FAM (parent/family characteristics). As long as all these variables that affect selection of child care type, quality, hours etc. are included in regressions, there is no necessary problem. But the influence of any variables that are omitted will be included in the error term when estimation takes place. So if key selection variables are omitted (i.e., are unobservable or unmeasured in the data set), there will be a correlation between CARE and the error term. In this case, a regression will estimate the effects of CARE with bias (will not produce an unbiased estimate). In other words, the average value of the estimate will be incorrect (probably – although not certainly - too large).

The various studies we consider in this section have used different ways to deal with this selection problem, but the primary one (and the method used in this study) is the inclusion of variables in the estimating equation that are likely to have strongly affected the selection of type, hours, quality etc. of care. In the articles we review, this technique is generally found to produce results that are similar to those using other types of selection controls.

What variables are included to control for selection effects? In general, the variables likely to be associated with selection of a particular type (or quality, or hours) of care will be variables describing the family (its tastes and resources and how it functions), the child (its particular needs, abilities and temperament), and the various home inputs that are substitutes for or complements to the child care inputs. In other words, the vectors of variables are FAM, CHILD and HOME. For NICHD and Duncan, the particular variables include family income as a percent of poverty line, mother's education, mother's intelligence, maternal depressive characteristics, presence of two parents in the household, family's ethnic background, maternal attitudes to the benefits of work, child's gender, child's temperament, parenting skills, maternal sensitivity, characteristics of the home learning environment, child rearing attitudes, and separation anxiety for the mother.

Apart from randomized control trials, the seven main techniques used to control for selection effects are:
1. Include a range of normally unmeasured selection variables in regressions on child development
2. Estimate the "change (or difference)" in child development, rather than its level, assuming that the effects of unobservable selection effects will be "differenced-out"
3. Instrumental Variables – find an instrument for the "treatment" variable that is not correlated with parent and child selection effects

4. Fixed-effects model (e.g., sibling fixed-effects) – compare only children for whom the selection factors are the same (e.g., within the same family)
5. Propensity score matching – compare outcomes of children who are treated only to outcomes of children who had a high probability (propensity) of being treated (but were not)
6. Natural experiment, difference-in-difference model – If a policy change affects two groups of children differently, compare the average change in the two groups of children
7. Regression discontinuity design – If access to treatment depends on a forcing variable (e.g., child age), compare only those children who were just on the margin of being treated (and were treated), to those who were just on the margin of being treated (and were not).

NICHD and Duncan (2003) use techniques 1 and 2 from this list, and find that adding additional regressors related to selection reduces substantially the estimated size of child care quality effects in the NICHD study. They caution researchers not to include (as selection-related regressors) variables that could themselves have been affected by the use of child care.

Magnuson, Ruhm and Waldfogel (2007) use techniques 1, 3, 4 and 5 from the list in an analysis of the effects of state prekindergarten programs on the school readiness of children. For instrumental variables, various measures of access to state prekindergarten programs are used as an instrument for prekindergarten use. Their objective is to find an instrument that is highly correlated with the use of prekindergarten, but does not affect the relevant child outcome in any other way than through prekindergarten attendance.

Bernal and Keane (2010) use a complex set of instruments to estimate the effects of child care attendance on single parent children in the U.S. Over a period of years, there have been a large number of state-specific changes in welfare rules affecting single parent employment and child care use. Bernal and Keane use these changing rules as instruments for employment and child care use and find negative effects of mother's employment on child cognitive development.

Magnuson, Ruhm and Waldfogel (2007) estimate a teacher fixed-effects model. In this regression, they compare results only for children that ended up in same school classroom (some of whom attended prekindergarten and some of whom did not). The maintained assumption is that children who end up in the same classrooms will have similar selection effects, because they are likely to have come from the same kind of background.

Currie and Thomas (1995) use a sibling fixed-effects model to study the effects of Head Start. Presuming that selection effects are largely influenced by factors related to the family, their technique compares only the results for one sibling who has attended Head Start to the results for another sibling in the same family who has not attended Head Start. They find substantial effects of Head Start in a group of related studies. Their technique will not produce unbiased results if

selection of Head Start attendance within the family is non-random. If families choose the brightest child, or the slowest learner amongst siblings to attend Head Start, Currie and Thomas' results could be biased.

Propensity score matching can be used to choose better "control" groups for various groups of "treated" children. In general, the researcher estimates a probit or logit on the probability of receiving the "treatment." The results can be used to calculate the probability (i.e., a propensity score) that each child in the data set will receive the treatment. Each treated child is matched with a group of untreated children who, nonetheless, had a similar probability of being treated. The difference in child outcomes is presumed to be a treatment (rather than selection) effect. Because only observable variables can be used to calculate the propensity score, this technique is sometimes known as selection on observables. Hill, Waldfogel and Brooks-Gunn (2002) used a form of propensity score matching to find strong and persistent effects of centre-based care in the Infant Health and Development Program. Magnuson, Ruhm and Waldfogel (2007) use propensity score matching to find effects of prekindergarten on school readiness using the Early Childhood Longitudinal Study – Kindergarten Cohort.

If a child care policy reform affects two groups of children differently, it may be possible to use a data set to compare the change in those newly eligible for treatment to the change in those not eligible. Baker, Gruber, Milligan (2008) used this differnce-in-differences technique to study the effects of the Quebec child care reforms in the late 1990's. They use children in English Canada as a comparison group, so that the before-after measures on child development indicators in Quebec are compared to the before and after measures on the same indicators in English Canada. They find a widespread pattern of negative social-emotional-behavioural effects of the reforms.

Havnes and Mogstad (2009) used a child care policy change for 3-6 year-old children in Norway in the 1970's in a similar fashion. Some municipalities became eligible for this policy change expanding the availability of subsidized child care while other similar nearby municipalities did not. Using a difference-in-differences technique, Havnes and Mogstad compare the effects 30 years later for children in these two groups of municipalities and find substantial effects.

Gormley, Gayer, Phillips and Dawson (2005) study short-term child outcomes from universal 4-year-old prekindergarten in Tulsa, Oklahoma using a regression discontinuity design. In this case, the discontinuity is based on age – age cutoffs for eligibility were very strictly enforced. An RDD regression compares children on either side of this discontinuity and determine whether there is a jump in development for children who were just eligible in comparison to those otherwise identical children who were just not eligible for prekindergarten. They find very substantial effects on math, reading and language of participation in a high quality 4-year-old prekindergarten in the school system.

Ludwig and Miller (2007) use RDD to study the long-term effects of Head Start. In this case, the discontinuity is based on geography. Initial recruitment efforts

for Head Start focused very strongly on the 300 poorest counties in the U.S. Child outcomes are compared for these 300 counties to those for children in similar counties who were just above this poverty-level cutoff.

A Summary of Evidence on the Effects of Child Care on Child Development

THE EFFECTS OF CHILD CARE QUALITY

The best evidence we have is that quality is the key positive feature of child care programs that promotes child development. Quality is defined in two possible ways – process quality or structural quality. Process quality is a summary measure produced by trained observers using scales developed for this purpose. There are continuing debates about how best to define process quality, but there is also broad agreement on essential components of it (especially the nature and frequency of caregiver-child interactions, and the characteristics and richness of the care, play and learning environment). Structural quality is indicated by the value of some key input(s) to quality (such as adult-child ratio or caregiver training in early childhood education).

In *From Neurons to Neighbourhoods: The Science of Early Childhood Development*, Shonkoff and Phillips summarize their findings from the literature on child care quality and child development in this way:

> "In sum, the positive relation between child care quality and virtually every facet of children's development that has been studied is one of the most consistent findings in developmental science. While child care of poor quality is associated with poorer developmental outcomes, high quality care is associated with outcomes that all parents want to see in their children, ranging from co-operation with adults to the ability to initiate and sustain positive exchanges with peers, to early competence in math and reading. This conclusion derives from experimental research on high-quality interventions for children at risk, as well as from weaker correlational designs that assess a broad range of quality and a broader distribution of children. The stability of child care providers appears to be particularly important for young children's social development, an association that is attributable to the attachments that are established between young children and more stable providers. For cognitive and language outcomes, the verbal environment that child care providers create appears to be a very important feature of care.
>
> The influence of child care is not as large as the influence of the family environment, but it emerges repeatedly in study after study, using different measures, and for children of different ages and living in different circumstances" (Shonkoff and Phillips, 2000, pp. 313-4)

Strong evidence of the positive cognitive and language effects of child care quality comes from experimental studies for disadvantaged children. Intensive, high-quality centre-based interventions that provide learning experiences directly to the young child have a positive effect on early learning, cognitive and language development and school achievement (Barnett, 1995; Brooks-Gunn et al., 1994; Burchinal et al., 1997; Ramey and Ramey, 1998; Roberts et al., 1989).

The impacts of some programs have been found to continue well into the school years and sometimes adulthood (Campbell and Ramey, 1994; Currie and Thomas, 1995; Lazar and Darlington, 1982; Luster and McAdoo, 1996; McLoyd, 1997; Yoshikawa, 1994, 1995).

The quality and intensity of these programs appear to be important to their success, but the contribution of other attributes (age of child served, concurrent parent support programs, curriculum, demographic characteristics of group of children served) is uncertain. There is some evidence that child-centred programs are preferable to teacher-centred ones, but that a range of curricular models have positive effects. Further, it is uncertain whether the age of entry to these programs is of key importance.

In NICHD (2000, 2002, 2003), measures of caregiver behaviour predicted children's performance on standardized cognitive and language assessments at 15, 24, 36 and 54 months, controlling for amount and type of care and an extensive list of family covariates. In the Cost, Quality and Child Outcomes Study (Peisner-Feinberg et al., 2001) process quality predicted cognitive, language and social development during the early years of school. Children who had had closer relationships with their preschool teachers were more sociable in kindergarten (controlling for prior child adjustment and family factors), and children who were enrolled in higher quality child care displayed better math skills prior to school entry and during kindergarten and second grade.

The child's relationship with the care provider apparently is key for social-emotional development. The issue is the formation of secure attachments to child care providers when child care arrangements are stable leading to adaptive social development.(Peisner-Feinberg et al., 2000; Howes et al., 1988, 1994; Howes, 2000).

There is not yet sufficient evidence about the size of the effects of child care quality on children's cognitive and language development. The best evidence from naturalistic samples suggests the short-term effects are modest, less than half the size of parental quality inputs. A recent careful study (NICHD and Duncan, 2003) finds that "child care quality is a modest, but reliable, predictor of cognitive development and academic achievement during early childhood (p. 1470). These authors conclude that the effect sizes are from .04 to .08 in magnitude from a continuous one standard deviation increment in process quality when children are between 24 and 54 months of age.

These effect size estimates are smaller than found in other studies. The Cost, Quality and Child Outcome Study found an effect size of .20 on language and math skills at kindergarten entry for a 9-month increment in child care quality (Peisner-Feinberg et al., 2001). For the Abecedarian experimental study using high-quality child care for disadvantaged children, the effect size for I.Q. was 1.0 at 3 years and .75 at 5 years for 3-year and 5-year treatments. For the 1-year and 2-year part-day program treatment in the Perry Preschool Experiment, the

effect on I.Q. was .60.

It is not clear how to interpret these different estimates of the magnitude of impact. One possibility is that children from disadvantaged families benefit disproportionately from child care, especially child care of high quality. In fact, it has become an article of received wisdom that carefully-designed early childhood "interventions" are capable of having very substantial positive long-term effects on children's lives. Further, the monetary benefits of these interventions have been found to be substantially greater than the costs (Heckman and Masterov, 2004).

THE EFFECTS OF TYPE OF CHILD CARE

Different types of child care (e.g., centre care, family home care) offer different experiences to children. Child care centres have more educated caregivers, more materials and activities, but also larger group sizes, more children per adult, and often more structured and educational activities. Child care homes, especially unregulated ones, have more free play, learning is more casual, and more time is typically spent watching TV or videos.

The NICHD (2000a, 2000b, 2002) has found that children spending more time in child care centres had higher cognitive and language scores at 24, 36 and 54 months after controlling for family background differences and the quality and amount of child care received. These results are also consistent with important cognitive gains found amongst disadvantaged children in centre-based programs (assessed in experimental studies) such as the Perry Preschool Project (Schweinhart, Barnes and Weikart, 1993), the Abecedarian Project (Ramey, Campbell and Blair, 1998; Campbell, Ramey, Pungello, Sparling, and Miller-Johnson, 2002), and the Infant Health and Development Project (Brooks-Gunn et al., 1994; Hill, Brooks-Gunn and Waldfogel, 2003), and from quasi-experimental studies assessing the Chicago Parent-Child Centre program (Reynolds and Temple, 1998; Reynolds, Temple, Robertson and Mann, 2001).

Cumulative experience in high-quality centre-based care starting in the second year of life (i.e., age one) may be particularly beneficial for children. This appears to be related to the amount of language stimulation from teachers who have more education and more specialized training in ECE. They talk and respond to children, it appears, in ways that foster language and cognitive development (NICHD, 1996)

Some studies find that centre-based care is especially beneficial for children from low-income families (Caughy et al., 1994), but other studies find that all children benefit regardless of their family background (NICHD, 2000).

Gormley, Gayer, Phillips and Dawson (2005; henceforth Gormley et al.) uses a regression discontinuity design to compare children using universal 4-year-old prekindergarten in Tulsa, Oklahoma, to those children just excluded from prekindergarten because of their age. The effects they find are very strong, and not affected by narrowing the age bands considered so that the treatment and

control groups are of virtually identical ages. Using nationally-normed test instruments (Woodcock-Johnson subtests for letter-identification [pre-reading], spelling [pre-writing] and applied problems [pre-math]), Gormley et al. find effect sizes from one year of a very good quality prekindergarten program of 0.79 of a standard deviation for pre-reading, 0.64 of a standard deviation for pre-writing and 0.38 of a standard deviation for pre-math. Strong positive effects were found for both disadvantaged and middle-class children, and from different racial and ethnic groups (with, in general, somewhat larger effects for disadvantaged and both Black and Hispanic children, but substantial positive effects for all children).

The Oklahoma results were partly due to the very high quality of prekindergarten services provided. Prekindergarten services were provided in the schools, mostly full-school-day, by teachers who had both a teaching certificate and a certificate in early childhood education, and who were paid at public school rates. Classroom sizes were capped at 20 children, and, with one lesser trained assistant, this meant that staff-child ratios were 1:10. However, a similar pattern has been found in other prekindergarten programs. Barnett and colleagues (Barnett, Lamy, and Jung, 2005) replicated the regression discontinuity design in the study of prekindergarten programs in five states: Michigan, South Carolina, New Jersey, West Virginia and Oklahoma. Some of these programs are universal and some targeted, but not as well-resourced as the Tulsa program. In all five states, they found substantial gains in both pre-reading and pre-math skills.

Of course, these latter results are for prekindergarten, rather than child care or other preschool. However, there is good evidence that child care can have positive cognitive effects too, even in the U.S. where average quality is acknowledged to be low. The NICHD studies (by the Early Child Care Research Network for the National Institute of Health and Human Development, hence NICHD-ECCRN) are the best-resourced studies of “normal, everyday” child care ever to be conducted in the U.S. As described above, NICHD and Duncan (2003) conclude that the effects of quality are relatively small (0.04 to 0.08 of a standard deviation on cognitive outcomes for children), but that, in addition, use of centre-based care in the third and fourth year of a child’s life has an independent effect of about 0.25 on cognitive and academic achievement outcomes. Taken together, the NICHD estimate of the effect of a good quality centre-based program would be substantial (less than half the size of the effects of parenting or home environment or being in poverty, but still sizeable).

Bernal and Keane (2008; 2010) use an instrumental variables technique with a sample of single mothers in the National Longitudinal Study on Youth. State level changes in welfare rules and child care subsidization in the United States were used as instruments for non-parental child care use. They find that an extra year of child care use reduces cognitive test ability scores of preschool children by between 2%-3% (.11 to .14 of a standard deviation). These negative effects are smaller for mothers with less education. However, the authors find that centre-based care (which they presume is of higher quality) does not have these

negative cognitive effects on children; it is only informal care provided by relatives or non-relative caregivers that have these effects.

Other studies of centre-based programs include various studies of Head Start by Janet Currie and different colleagues (Currie and Thomas, 1995; Currie and Thomas, 1999; Garces, Thomas and Currie, 2002). These are studies of the effects on Head Start children, who are a targeted low-income group. Head Start programs are more heterogeneous than state-guided prekindergarten programs would be. Approximately one million children per year go to Head Start programs in the U.S. each year.

The Currie studies are well designed to account for selection bias; the main technique used is sibling fixed effects. In other words, the control group for the effect of Head Start is composed of the sibling of each Head Start attendee who did not attend Head Start. This controls for unmeasured family characteristics that might affect both Head Start enrollment and child outcomes. Currie and Thomas (1995) find long-term (i.e., into the early school years) positive effects on school achievement for white Head Start attendees, but not for African-American children. In a second paper (1999) Currie and Thomas found long-term positive effects on school achievement for Hispanics. In a follow-up study of effects at age 21, Garces, Currie and Thomas (2002) found white children who attended Head Start were more likely to complete high school and to attend college, and to earn more than other white children who did not attend Head Start. Black children did not have the same school achievement gains but were significantly less likely to be arrested for criminal activity than similar children who did not attend Head Start.

In summary, there are good reasons to believe that some forms of centre-based child care/preschool/prekindergarten can have important positive effects on children, whether these children are disadvantaged and low-income and from lone-parent families or whether these children are from middle-income and two-parent families. The effect sizes appear to be dependent on the quality and type of care/education they receive, as well as on the family situation of the child, as you would expect.

THE EFFECTS OF HOURS OF CHILD CARE

Belsky (1986, 1988, 2001) has argued that early and extensive hours of child care when children are young place them at risk for future socioemotional problems. Other researchers believe that these findings are better explained by either the quality of child care (Phillips, McCartney, Scarr and Howes, 1987) or a failure to distinguish between, for instance, assertiveness and aggressiveness in assessing children (Clarke-Stewart, 1989).

It is not obvious how these results should be interpreted to apply to Canada. In the U.S., 72% of all infants are in regular nonmaternal care by 4 months of age (for an average of 29 hours per week). With one year of paid maternity/parental leave available to many families in Canada, patterns of early child care use are

very different.

The NICHD (2001, 2003) has found evidence that more hours in a child care arrangement is associated, at 24 and 54 months and in kindergarten, with various behaviour problems. NICHD (2001) found that more hours in child care up to age 2 were associated with more negative interactions with peers and more behaviour problems as reported by caregivers, and less social competence as reported by mothers. At 4½, more hours in child care was associated with more negative play, less social competence and more externalizing behaviours. In kindergarten, this was associated with more externalizing behaviour problems and more teacher-child conflict. These effects were moderated by the quality of child care and the quality of parenting received by the child, but were still statistically significant and quantitatively important after controlling for these influences.

Gunnar and her colleagues (Dettling, Gunnar, and Donzella, 1999; Tout, de Haan, Campbell and Gunnar, 1998; Watamura, Donzella, Alwin and Gunnar, 2003) have found that negative behavioural effects of child care appear to be related to the patterns of cortisol levels in children over the day. It is suggested that toddlers and preschoolers who are learning to negotiate with peers may experience group settings, such as child care centres, as especially socially demanding and stressful. Vandell (2004) suggests that research should consider changes in program organization, curriculum and teacher training that might reduce this harmful stress. This research could use cortisol findings as an important tool to guide results (Maccoby and Lewis, 2003).

The size of the negative behavioural effects of child care hours found in the NICHD studies is similar to the effects on behaviour of parenting quality, and is therefore substantial enough to be meaningful and policy-relevant. The effects on behaviour do not appear to be related to a threshold level of hours, but it is only children in child care for more than 30 hours per week who, on average, had more than normal behavioural problems, and only children spending over 45 hours per week over the whole period from 3-54 months who displayed high levels of negative externalizing behaviours.

The evidence about cognitive effects from early-in-life child care from nonexperimental studies is contradictory and inconsistent. Vandell and Corasaniti (1990a, 1990b) reported that extensive care beginning in infancy was associated with poorer scores on standardized cognitive measures. Others (Thornberg et al., 1990; Ackerman-Ross and Khanna, 1989; Burchinal et al., 1995) found no effects of infant child care relative to home care.

Caughy, DiPietro and Strobino (1994) reported that enrollment in day care before age 1 was associated with better reading recognition scores for 5 and 6 year old children from impoverished backgrounds, but poorer scores for children from more advantaged backgrounds. Centre-based care begun in the first three years was also associated with higher math performance scores in children from poor households, but lower math scores for children coming from more stimulating

home environments.

However, quite different results were reported by Andersson (1989, 1992) from a Swedish longitudinal study. Children who entered child care in the second half of their first year scored significantly better on standardized measures of cognitive ability and teacher ratings of academic achievement at both 8 and 13 years of age, even after controlling for differences in family backgrounds.

CANADIAN STUDIES OF CHILD CARE AND CHILD DEVELOPMENT

The results found in Canadian studies using NLSCY data are of particular interest for our study. Kohen and Hertzman (1998), using only data from the first cycle of NLSCY, found that 4 and 5 year olds who received some form of out-of-home child care had significantly higher scores on a standardized measure of receptive vocabulary (the Peabody Picture Vocabulary Test-Revised: PPVT-R) than children who stayed at home with a caregiver. Furthermore, childcare outside of the home had the greatest impact on vocabulary scores for children from lower income households. It is unclear how much of these results are due to selection effects vs. child development effects.

Using the first cycle (1994-1995) of the NLSCY, Lefebvre and Merrigan (2002) show that non-parental care (center- or family-based), compared to parental care, has no effect on the cognitive development of children, as measured by an index of their social and motor development (in the case of children aged less than 48 months) or by PPVT scores (4- and 5-year-old children). The estimates show that some observable family characteristics such as the mother's education and immigration status have very strong effects on a child's score. Sibling fixed-effect estimations support the results obtained from OLS. Because Lefebvre and Merrigan use only first-cycle data, the child outcome data come from the same time period as the child care use; in other words, child care use and child development measures are contemporaneous. Neither they nor Kohen and Hertzman (1998) are able to study the influence of early experiences on later outcomes.

Using two cycles of NLSCY data, Lipps and Yiptong-Avila (1999) compared the level of performance in kindergarten of two groups of children. The first group included those who attended any type of non-parental care (early childhood program, a day-care centre, or received care from a paid worker such as a nanny or a relative other than the mother or the father of the child). The second group of children had stayed at home with a parent. When followed up, the children in the first group were faring better at school.

Two years later about 40% of children who were in non-parental care at the age of 2 and 3 were judged by their teachers as being near the top of their kindergarten class in communication skills, as opposed to only 25% who did not participate in such programs. Also, 38% of these children were rated by their teachers as being near the top of their kindergarten class in learning skills, compared with 24% of kindergarten children who did not attend an early

childhood program. These relationships hold true regardless of the education of the child's mother or the income of the household.

The study also found that four and five years old children who in 1994/95 were in non-parental care did better in math achievement in Grade 1 two years later. These children were 1.4 times more likely to be rated by their teachers as being near the top of their class in mathematics achievement in Grade 1 in 1996-97 than those who stayed at home with a parent. As in the case of kindergarten achievement, these results hold true after statistically adjusting for the influence of the income of children's households and the education of the child's mother.

With three cycles of the NLSCY (1994-1995 through 1998-1999), Lynda Gagné (2003) studied the effect of parental work and the use of daycare services on the PPVT scores of 4- and 5-year-olds. The author's first step is to classify mothers within categories on the basis of their parenting ability scores and their level of education. The results suggest that full-time employment of a "high quality type" mother induces a lower cognitive score for the child. The converse is true for a "low quality type" mother. Otherwise, full-time employment has no effect, as well as hours of non-parental care, except for affluent children who benefit from them. Results are similar with fixed effect estimation methods. Gagne does not analyze the effect of different types of child care; all types of non-parental child care are lumped together.

Seifert, Canning and Lindemann (2001) look at child development of children less than four years of age using the first three cycles of data from the NLSCY. They examine multiple indices of child development including the PPVT-R, the Motor and Social Development Scale, measures of pro-social behaviour, hyperactivity, emotional disorder and physical aggression. Analyzing child care use patterns they find that single mothers were more likely to be in centre-based care than children of couple families with two biological parents. They also find that children tend to enter non-parental child care at about two years of age and once in child care tend to remain in child care.

On child development, these authors found that "the effects on child development seem minimal with effect sizes that ranged from negligible to moderately small. However, children in the lowest income group who attended sustained child care did have higher PPVT scores than those who did not, suggesting that children who are economically disadvantaged may benefit from child care."(Executive Summary)

Using the first two cycles (1994-1995 and 1996-1997) and cycles four and five (2000-2001 and 2002-2003) of the NLSCY, Baker, Gruber and Milligan (2005) analyze the impact of Québec's childcare policy on childcare use, maternal work, and diverse outcomes measuring the "well-being" of both children (0 to 4 year olds) and parents. The estimation approach is a difference-in-differences one.

Their results on the impact of the Quebec child care reforms on maternal work

are very similar to Lefebvre and Merrigan (2007, 2005a, 2005b). Overall, Baker, Gruber and Milligan find that Quebec's program increases maternal labour supply as well as producing a shift in childcare use from informal to formal settings. Moreover, they highlight the fact that Québec's childcare policy had adverse consequences on the "well-being" of parents and children. Specifically, this policy is estimated to have had deleterious effects on both the behaviour and health of Quebec's children (aged 2 to 4 years). Parents are also subject to this last effect and, at the same time, appear to display worse parenting practices than before. The authors suggest these results may be temporary.

Lefebvre, Merrigan and Verstraete (2008) use a difference-in-differences methodology and six cycles of data from the NLSCY to examine the effects of Quebec's reforms in child care and family policy on the cognitive/language development of four- and five-year-old children in Quebec. They find substantial negative effects of the policy (one-fifth to one-quarter of a standard deviation), with larger negative effects for children of less-educated mothers. The authors emphasize that their results cannot be considered as an evaluation of the effects of child care on the development of children. Instead, they are an evaluation of the effects of a "low-fee-for-long-hours-in-daycare policy on cognitive development." They suggest that, in addition to long hours, the quality of Quebec's child care contributes to these negative effects. The reliance on family-based child care, on for-profit providers, and on employment of child care workers without specific ECEC training has reduced the quality of child care provided.

Summary

Child care is largely used as a complement to parental employment, especially mother's employment. The literature suggests that the characteristics of mother's employment (hours, shifts) will be of key importance to patterns of demand, but that child characteristics (age, numbers of children), family characteristics (mother's and father's incomes, region, family functioning) and the characteristics of the types of care available (price, convenience, quality) will also be important.

This study focuses on the role of membership in four population groups in affecting patterns of child care demand. The modest existing literature suggests that immigrant families are more likely to depend on child care provided by relatives, but there is also evidence that they attend preschools at rates higher than other families. Immigrants from different countries of origin may make quite different child care decisions. Lone mother families are disproportionately likely to use regulated care. Existing studies suggest that rural families are less likely to use regulated care and more likely to use care by relatives or neighbours (although it is unclear what role preference and availability play in these decisions). There is no existing literature on the child care decisions of official language minority families.

A large literature on child care and child development finds that the quality of child care (i.e., the process quality, centred on child/caregiver interactions and the characteristics of the learning environment) matters most to the various effects that child care has on children. The type of care also has some effects on children with regulated or centre-based care having positive cognitive effects holding quality constant, and preschools apparently having similar positive effects. There have been some findings of negative effects of long hours of child care on children, particularly when those long hours of care start very early in the child's life and are continued through the years before school.

Our literature review considers the empirical studies of the effects of child care on Canadian children that have used the NLSCY as data. Many of these have found zero or negative effects of child care use on children, in some contrast to studies elsewhere.

3. Child Care Use Patterns

This chapter explores the child care use patterns of immigrant, lone mother, rural and official language minority families in comparison to the rest of the Canadian population, for families with a mother who is employed or studying. The dimensions of child care use include type of child care used, hours per week of child care, the use of multiple types of child care in the same week, and the weekly or annual expenditure on child care. The basic patterns of difference and similarity are explored in a series of tables. This includes an exploration of the changes over time in the patterns of type and hours of care used.

Regression analysis is used to analyze the separate effects of a wide range of child and family characteristics on the child care use patterns of Canadian families with special attention to the influence of membership in each of the four population groups of interest. Cross-tabular evidence about the factors associated with child care use patterns is available in Appendix B.

Data Sources and Data Limitations

Nearly all the evidence cited and analyzed in this chapter and the next comes from the National Longitudinal Study on Children and Youth (NLSCY). The NLSCY is a long-term study conducted by Statistics Canada and sponsored by Human Resources and Skills Development Canada (HRSDC). The primary objective of the NLSCY is to monitor the development and well-being of Canada's children from infancy to adulthood.

The NLSCY follows a representative sample of Canadian children from birth to early adulthood, with data collection occurring at two year intervals. The first collection of information (Cycle 1) took place in the winter and spring of 1994/1995. In addition to following the original longitudinal panel of children, now aged 12 to 23 years in Cycle 7, the survey has continued to add and follow a new sample at each cycle to monitor early childhood development. In Cycle 7, this sample was comprised of children aged 0 to 9 years.

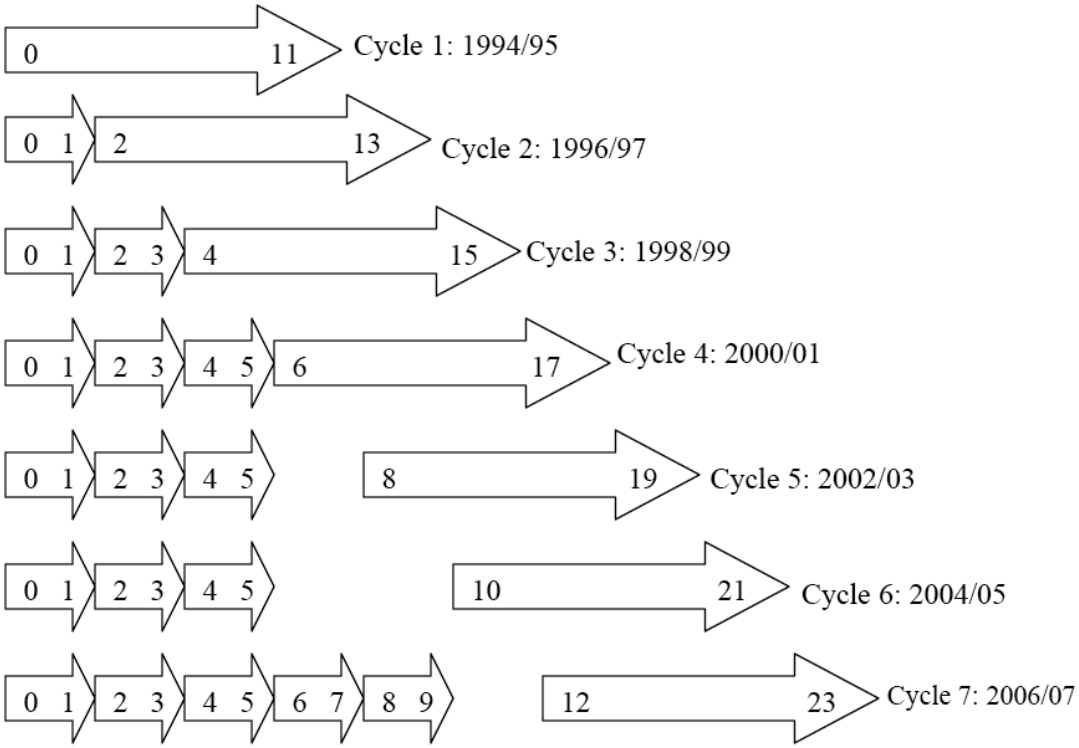
Much of the information in the NLSCY is collected from parents on behalf of their children by means of a household interview. This information includes questions answered directly about demographic variables and income. The data in the NLSCY also includes various scales (such as ones measuring maternal depression, family functioning and parenting). A scale is simply a group of questions or items that measures a certain concept when the answers to the items are put together.

The NLSCY includes a small number of direct measures of achievement: for instance, interviewers administer a receptive vocabulary test as well as a test of early writing and numeracy skills for children aged 4 to 5 years. Children in grades 2 to 10 complete a short mathematics/computation assessment.

The NLSCY questionnaires are available in English and French. If a respondent

wishes to be interviewed in another language, the case will be given to an interviewer who speaks the respondent's language, if possible. In Cycle 7, fewer than forty cases were not completed because of a language barrier.

As the graphic below indicates, at Cycle 7, the NLSCY sample consists of children aged 0 to 9 years old (Early Childhood Development or ECD children) and youth and young adults aged 12 to 23 years old (original cohort). The effective age of children at Cycle 7 is as of December 31st, 2006. Thus, 0-year-olds in Cycle 7 are born in 2006 and 1-year-olds are born in 2005.



Data Limitations

The NLSCY asks parents a number of questions about their current use of child care in each cycle. The initial question asked of parents is the following: *While you (and your spouse/partner) are at work/studying, do you currently use child care such as daycare, babysitting, care by a relative or other caregiver or a nursery school?* The follow-up question is *While you (and your spouse/partner) are at work or studying, which of the following methods of child care do you currently use?* A list of types of nonparental child care follows this question.

As a result, these questions from the NLSCY only contain valid data on the child

care use of families in which (all) parents are employed or studying. Despite the fact that other parents in the NLSCY sample have answered these (and follow-on) questions, their answers cannot be considered valid for families in which at least one parent is not currently employed or studying (see Appendix A in Cleveland et al. (2008) for a discussion of this issue).

There are some other limitations of NLSCY data for studying child care use. We would expect that the characteristics of the type of care used (and the characteristics of other types available to the parent) would influence the decision to use a particular type of care. In particular, we would expect the quality, convenience and price of child care to strongly influence use patterns for any family. Cycle 7 of the NLSCY includes parental reports on some aspects of quality, convenience and weekly expenditure on child care. However, the parental reports have not been validated against any objective measures of quality or convenience, and the reports on quality-related measures are likely to be strongly upward biased (Mocan, 2007). With some adjustment for selection effects and for the effects of flat fees, the weekly expenditure data could be converted into hourly price data, but we have not attempted this.

The other key variable that is missing for analysis of child care use patterns is the wage rate of the mother and father. The wage rate is our best proxy for the value of time of the mother and father. Since the key constraints on family decisions about child care are likely to be income and time, this is an important variable.

Even with these limitations, the NLSCY is the best (and essentially the only) data set that can be used to analyze current Canada-wide child care use patterns.

Methodology

From other studies discussed in the literature review and from our experience in studying child care, we anticipate that we will find that parents make very deliberate decisions about the type and hours of child care they will use and about their spending in purchasing nonparental care. Choosing child care is a balancing act, and the appropriate balance will be different for families in different financial and employment situations, for families with different preferences about care for children, and for children of different ages and genders with different needs. Although our data set does not have information about the quality, convenience, price and other characteristics of the care available to any family, it seems obvious that those characteristics should also have substantial effects on family decisions.

The first stage of our investigation of child care use patterns is to determine whether families in our four population groups make different child care decisions than families outside the population groups. The tables in the next section show the patterns of child care use by immigrant families, lone mother families, rural families and official language minority families in comparison to the use patterns of the total population of preschool children of employed and studying mothers. These tables cover primary types of child care used, the total number of hours of

nonparental care, the use of multiple types of child care in a week, the weekly expenditures on all nonparental child care used as well as the change in patterns of child care type and hours over the NLSCY's seven cycles. Each of these tables indicates whether the patterns of use by different population groups are significantly different in a statistical sense from the patterns of use of families not in that population group.

The rest of the analysis in this chapter tries to uncover the key factors that are associated with child care use patterns. Our approach is similar to that of Hofferth and Wissoker (1992) and Hofferth, Chaplin, Wissoker and Robins (1996) as discussed in the literature review above. Because of the data available to us, we cannot use regression analysis to estimate the joint decisions about child care and employment. Instead, we take mothers' and fathers' decisions about employment/studying as given and concentrate on analyzing the family decisions about type, hours and expenditure on child care.

We presume that a family chooses the child care type that gives it the highest utility. The utility of each particular mode of child care depends on the characteristics of the child care available to the family, the characteristics of the child, the mother's employment situation, and a range of other family characteristics including income and various family characteristics that are expected to be correlated with family preferences (e.g., education, aspects of family functioning). In addition, and of special importance to this study, we expect that membership in one of our four population groups will affect the utility of different types of care. Membership in these population groups could affect utility through differences in preferences, or through differences in availability (e.g., of relative care for immigrant families, of regulated care in rural areas) or price (e.g., for lone mother families).

The utility of choice n for family i (denoted V_{in}) is assumed to be a linear function of the variables described above and of a random component h_{in}. The utility function can be written as:

$$V_{in} = A_n + b_n CC_{in} + c_n CH_i + d_n ME_i + e_n F_i + g_n PG_i + h_{in}$$

In this utility function, A_n is a constant term that varies across types of care, CC_{in} is a vector of characteristics of different child care modes available to the family, CH_i is a vector of characteristics of the child and other children in the family, ME_i is a vector of employment characteristics of the mother, F_i is a vector of other family characteristics including income of the mother and father and factors correlated with preferences or family functioning, and PG_i is a set of dummy variables reflecting membership in each of the four population groups of interest: immigrant family, lone mother family, rural family and official language minority family.

The family is assumed to choose the type of care that gives the highest utility. We assume that the random component of utility is distributed independently across individual families and modes of care and that each is a draw from the

Extreme Value (I) probability distribution. As a result, we can estimate the coefficients of the utility function using multinomial logit statistical techniques. Because we do not have data on the distinct and varying characteristics of the different modes of child care, the interpretation of some of the other parameters of the model may be affected. This will be true when the unobserved characteristics of child care are correlated with observed (i.e., included) variables.

Tabular Evidence

Type of Child Care

Using Cycle 7 of the NLSCY, we will consider four types of child care use (regulated care whether in a centre or a regulated family home (and including nursery schools and preschools); unregulated care by a non-relative; unregulated care by a relative other than the child's parents, whether in the child's home or in the relative's home; and child care provided exclusively by the parents). Table 1 is particularly useful at the beginning of our analysis because it shows the broad child care use patterns by the four population groups in comparison to the preschool children (of employed and studying mothers) as a whole.

The story that this table tells is one of both difference and similarity. The patterns of child care use by each of the population groups differs in a statistically significant way from the pattern of use by those families not in the population group. The patterns of child care use by lone mother families are most obviously distinct. They are more likely to use regulated care and less likely to use exclusively parental care, than the population as a whole. Rural families, on the other hand, are noticeably less likely to use regulated care, and a little more likely to use any other form of care. Immigrant families are more likely to use care by a relative than the population as a whole, and correspondingly less likely to use non-family types of care. Official language minority families are a little more likely to use non-family types of care and less likely to use exclusively parental care.

However, in other ways, the patterns of care by these population groups mirror that of the population as a whole. For all families combined, regulated care is most frequently used as the primary type of care. Second in order is parental care. Third is care by a relative, followed closely by unregulated care by a non-relative. The same rank ordering of types of care is true for children in immigrant families and children from rural families. Lone mother families are so unlikely to use care by a parent that care by a relative is slightly more likely than parental care. And, in official language minority families, care by a non-relative is somewhat more likely than care by a relative.

We find that regulated care is the primary mode of care used by nearly 41% of preschool children, non-relative care is used by about 14%, relative care is used by about 16% and exclusively parental care is used by about 30%. Remember that these figures refer to preschool children of employed or studying mothers, and therefore exclude care arrangements for preschool children for whom the

mother or both parents stay at home. There are about 1.25 million preschool children in Canada with mothers employed or studying.

Table 1
Primary Type Of Child Care Used By Different Population Groups In Canada For Preschool Children With Employed Or Studying Mothers, 2006-7

	Regulated Care	Unregulated Non-relative	Care by a Relative	Exclusively parental care	Total
Immigrant Families	37.8%	10.1%	20.3%	31.9%	100.0%
Lone mother families	52.3%	11.9%	18.2%	17.6%	100.0%
Rural Families	32.5%	17.6%	18.8%	31.0%	100.0%
Official Language Minority Families	42.0%	18.6%	15.3%	24.1%	100.0%
All families combined	40.8%	13.7%	15.9%	29.6%	100.0%

Notes: For each of the population groups, a Pearson Chi-Square test finds that its pattern of child care use is significantly different (at .05) from the pattern of use by those not in the population group.
In this table, "all families combined" refers to all families in Canada with preschool children of employed or studying mothers. Immigrant, lone mother, rural and official language minority families are, of course, part of this total.

THE TERMINOLOGY OF TYPE OF CHILD CARE

We analyze four broad types of child care in this study: regulated, unregulated non-relative care, unregulated relative care, and care exclusively by parents. Sometimes, for discussion purposes it is useful to group child care use types differently. So, for instance, one could talk about parental care vs. non-parental care. In this categorization, regulated care and the two types of unregulated care would be grouped together as "non-parental child care". Or, one could talk about family-based child care (which would group together care by relatives and care by parents) vs. extra-family child care or non-family child care (regulated care grouped together with unregulated care by a non-relative). Or, one could talk about regulated child care vs. informal child care vs. parental care. In this use of terminology, unregulated care by a non-relative would be grouped together with unregulated care by a relative to comprise informal care.

This terminology gives us the possibility of quick thumbnail descriptions of child care use patterns by our population groups of interest in comparison to the general population of Canadian preschool children (with employed or studying mothers). We can say now that preschool children in immigrant families rely more on family-based types of care (about 50%) than do preschool children from non-immigrant families (a little over 40%). We can say that children from lone-parent families are more likely (over 80%) to rely on non-parental care than are children from couple families (about 70%). We can say children in rural families are more likely to use informal child care (about 36%) than urban families (about 29%). And, we can say that children from official language minority families are more likely to use non-parental child care (over 60%) than other families (about 54%).

Hours of Child Care Use

Type of child care used is often the only dimension of child care use considered. However, families vary in the number of hours of non-parental care used per week. The table below gives aggregate figures for each of the population groups of interest, in comparison to the patterns for the population as a whole. If a child uses several types of care over the course of a week, this table will include all of these in the total of hours for that child. Some children will receive zero hours of non-parental care (i.e., they receive exclusively parental care). The remaining children are categorized into using either 1-19.9 hours, 20-29.9 hours, 30-39.9 hours or 40 hours or more of child care per week.

Table 2
Hours Of Non-Parental Child Care Used Per Week, By Category, By Different Population Groups In Canada For Preschool Children Of Employed Or Studying Mothers, 2006-7

	0 Hours	1 – 19.9 Hours	20 – 29.9 Hours	30 – 39.9 Hours	40 Hours or more	Total
Immigrant Families	31.9%	15.7%	12.7%	13.4%	26.3%	100.0%
Lone mother families	17.6%	16.1%	13.9%	17.6%	34.8%	100.0%
Rural Families	31.0%	22.9%	13.4%	13.5%	19.2%	100.0%
Official Language Minority Families	24.1%	21.9%	11.2%	14.6%	28.2%	100.0%
All families combined	29.6%	18.7%	13.9%	14.2%	23.5%	100.0%

Notes: For each of the population groups, a Pearson Chi-Square test finds that its pattern of hours of child care use is significantly different (at .05) from the pattern of use by those not in the population group
In this table, "all families combined" refers to all families in Canada with preschool children of employed or studying mothers. Immigrant, lone mother, rural and official language minority families are, of course, part of this total.

Looking at all families combined, at the bottom of Table 2, we can see that about 30% of children do not use non-parental care. Another nearly 19% use a relatively small amount per week (less than 20 hours) sometimes in combination with kindergarten. Nearly 30% more are distributed evenly in the two categories between 20 and 40 hours of child care per week, and just less than 25% of families use more than 40 hours of care per week.

There are some surprises looking at the hours of care for each of the population groups of interest. It is noteworthy that lone mother families are more likely than all families to use considerable amounts of child care per week – more than 50% use more than 30 hours per week, compared to less than 40% of all families. However, even immigrant and official language minority families use substantial amounts of child care per week (more than 30 hours) in greater proportion than all families. Rural families are less likely to use a large number of hours of care per week. In a statistical sense, every one of these population groups is different

from the families not in that population group when we consider the pattern of hours of child care used.

Use of Multiple Types of Child Care in A Week

There has been concern expressed about the use of multiple types of child care over the course of a week, for instance nursery school and a neighbourhood unregulated caregiver both on a part-time basis. If regulated care is only available part-day perhaps we might see a child using all three types of non-parental child care to patch together regular arrangements over the course of a week. The concern is that the use of multiple types of child care would create inconsistent caregiver-child relationships and attachments.

Given our definitions of types of care, we find little evidence of multiple use of care types in our analysis of the NLSCY Cycle 7 data[6]. Taking all families combined, only a little over 5% of children use two or three distinct types of non-parental child care over the course of a week. If we were to redefine multiple use of care types so that only arrangements lasting at least 5 hours per week were counted, the overall use of multiple types of care would fall to 3.9% of the population of preschool children with employed or studying mothers

There is, nonetheless, some variation across population groups in the use of multiple types of child care. Nearly 8% of rural children use more than one type of care, compared to about 5% of children from lone mother families, about 4% in official language minority families and about 3% of children in families with an immigrant mother or father. Of course, if kindergarten were included as a distinct type of care, or as part of regulated care, the apparent use of multiple types of care would rise. Many children, at age 4 or 5, attend kindergarten for part-day or a school-day and then use some other form of child care to fill the gap until the parents' employment day is complete.

It is important to note that our analysis of the use of multiple types of child care is affected by our definition of a type of care. For this paper, we have categorized child care into four types. Therefore, a child does not use multiple types of care unless she/he uses two or more of these four types during the week. A child that uses care by a grandmother for one part of the week and care by an aunt for the other part would be counted as using only one type of care – care by a relative. In the child development regressions later in this paper, we adopt a finer-grained definition of the use of multiple types of care, based on the individual types identified in the NLSCY.

[6] The calculation of number of types of care is sensitive to the definition of a type of care and to decisions to include or not include kindergarten as a form of child care. For instance, Bushnik (2003) identifies six types of non-parental child care; kindergarten would be a seventh. Using this breakdown, there would be much more use of multiple types of care in a week than we have identified using only three types of nonparental child care.

Table 3
Number Of Types Of Non-Parental Child Care Used For 1 Or More Hours Per Week By Different Population Groups In Canada, 2006-7

	None	One	Two or Three	Total
Immigrant Families	31.9%	65.2%	2.9%	100.0%
Lone mother families	17.6%	77.1%	5.3%	100.0%
Rural Families	31.0%	61.4%	7.6%	100.0%
Official Language Minority Families	24.1%	71.5%	4.4%	100.0%
All families combined	29.5%	65.0%	5.5%	100.0%

Notes: For each of the population groups, a Pearson Chi-Square test finds that its pattern of number of types of child care use is significantly different (at .05) from the pattern of use by those not in the population group
In this table, "all families combined" refers to all families in Canada with preschool children of employed or studying mothers. Immigrant, lone mother, rural and official language minority families are, of course, part of this total.

Weekly Child Care Expenditures

The final dimension of child care use that we consider is the amount of money expenditure used to purchase child care services for preschool children of employed and studying mothers in Canada. The table below only includes children in families using non-parental child care; it does not include families in which the child is cared for exclusively by parents. The table shows expenditure for one child in the family, not the aggregate of spending on all children (the Survey of Household Spending, in contrast, only provides data on child care spending for all children in the family).

Some non-parental care (e.g., care by a relative or fully-subsidized regulated care) may be provided without monetary charge. This is shown as costing $0 in the table. Weekly expenditure on all other non-parental care is categorized as a small weekly amount ($1 to $50), a medium weekly amount ($51 to $100), or a large weekly amount ($101 and up). Fifty dollars per week is $2,600 per year for

full-year care and $100 per week would be $5,200 per year for full-year care. Families may spend only a small or medium amount on child care if they only use care for a few hours a week. However, other families may spend a small amount because they are eligible to have their child care arrangement partially subsidized. This is particularly true of users of regulated care in Quebec (widely available at $7 per day, or $35 per week), and of lone parent families in the rest of Canada who are disproportionately likely to be eligible for provincially-financed (and sometimes municipally-financed) low-income child care subsidy for the use of regulated child care. Couple families with quite modest total incomes may also be eligible for partial subsidies in some provinces.

The average weekly expenditure on child care by all users of non-parental care (including those who spend zero) is about $83 per week. If we consider only those with positive expenditures, the average is nearly $100 per week ($98.75 – see Table 8 below). The data on expenditures for all families combined, at the bottom of Table 4, show that about half of all families using non-parental care spend zero or spend a relatively small weekly amount on child care, while the other half spends between $51 and $100 per week (about 20%) or more than $100 per week (about 30%).

Perhaps surprisingly, immigrant families are disproportionately likely to spend a large amount on child care (about 35% of the immigrant families who use non-parental child care). They are also more likely to spend zero (care by relatives) and less likely to spend a small amount on care. Lone mother families are disproportionately more likely to spend zero (perhaps because of child care subsidies) and less likely to spend a large amount per week. Rural families are more likely to spend a small or medium amount, and less likely (20% vs. about 30%) to spend a large amount per week. Official language minority families do not differ dramatically from the average family. They are somewhat less likely to have zero-priced care and somewhat more likely to have medium expenditures on care.

Table 4
Expenditure Per Week on Non-Parental Child Care, By Category, By Different Population Groups In Canada For Preschool Children Of Employed Or Studying Mothers, 2006-7

	$0	$1 - $50	$51 - $100	Over $100	Total
Immigrant Families	20.9%	25.7%	18.8%	34.6%	100.0%
Lone mother families	20.6%	34.3%	19.2%	25.8%	100.0%
Rural Families	15.1%	38.2%	26.5%	20.1%	100.0%
Official Language Minority Families	11.1%	34.2%	24.4%	30.3%	100.0%
All families combined	15.1%	33.9%	20.1%	30.8%	100.0%

Notes: For each of the population groups, a Pearson Chi-Square test finds that its pattern of child care expenditure is significantly different (at .05) from the pattern of use by those not in the population group.
In this table, "all families combined" refers to all families in Canada with preschool children of employed or studying mothers. Immigrant, lone mother, rural and official language minority families are, of course, part of this total.

Preferences

It is unfortunate that the NLSCY Cycle 7 data on preferences does not yield much useful information. Questions ask the responding parent whether he/she would prefer to use a different kind of child care than the one currently being used. However, this question is only asked of those currently using some form of non-parental child care, and not of those currently using exclusively parental child care. Further, when asked what kind of child care the family would prefer to use, respondents can provide more than one answer, and the answers are not ranked. These features of the questionnaire make it difficult to analyze the preferences of all families and, in particular, to analyze differences in preferences across our four population groups.

However, broadly we can observe that, of those families currently using non-parental care of some kind, about 15% of immigrant families, about 17% of lone mother families, a little over 10% of rural families, and about 17% of official

language minority families would prefer to use a different type of care.

The table below gives some sense of the main reasons why families are not currently using their most preferred option (the barriers to change). Note that, since a family can give more than one reason, the percentages sum to more than 100% (although only moderately more than 100%). The table includes only those families preferring to change arrangements. Cost, availability and waiting lists are significant sources of the reasons why families are not using their preferred type of care. For those preferring to use relatives, the absence of relatives close by is important. For those preferring parental care, but not using it, the inability to afford to stay home is a key reason. There is also a substantial "other" category in this table

Table 5
Reason Not Using Preferred Type Of Child Care for Different Population Groups In Canada For Preschool Children With Employed Or Studying Mothers, 2006-7

	Cost is too high	Not available for child age	Not available for my schedule	Waiting List	Transport Problem	No relatives close by (relative care)	Can't afford to stay home (parental care)	No places for special needs child	Other reason	Total Reasons
Immigrant Families	27.2%	7.1%	6.5%	27.9%	n.a.	8.8%	9.7%	n.a.	18.1%	105.3%
Lone mother families	25.5%	9.2%	7.3%	30.0%	n.a.	5.2%	12.7%	n.a.	21.4%	111.3%
Rural Families	16.4%	27.9%	12.3%	5.0%	4.2%	7.8%	9.0%	n.a.	29.5%	112.1%
Official Language Minority Families	36.5%	n.a.	n.a.	16.2%	3.7%	n.a.	11.0%	n.a.	24.9%	92.3%
All families combined	26.0%	9.4%	8.6%	20.3%	2.8%	7.3%	16.9%	0.4%	22.5%	114.2%

Changes Over Time in Child Care Use Patterns

The second of the four original research questions for this project concerns the way that use patterns of child care have changed for immigrant, lone mother, rural and official language minority families). In order to look at changes in child care use patterns, we compare Cycle 1 data (1994-95) to Cycle 7 data (2006-7) below. The changes in child care use patterns over this 12-year period are dramatic, both for children aged six months to five years as a whole and for each of the four population groups of interest.

Table 6
Comparison of Patterns of Use of Different Types of Child Care by Population Groups and Total Child Population with Employed or Studying Mothers, 1994-95 and 2006-07 – All of Canada

Notes: For each of the population groups, a Pearson Chi-Square test finds that its pattern of child care use is significantly different (at .05) from the pattern of use by those not in the population group.
In this table, "all families combined" refers to all families in Canada with preschool children of employed or studying mothers. Immigrant, lone mother, rural and official language minority families are, of course, part of this total.

	Regulated Care		Unregulated Non-relative		Care by a Relative		Exclusively parental care		Total
	1994-5	**2006-7**	**1994-5**	**2006-7**	**1994-5**	**2006-7**	**1994-5**	**2006-7**	
Immigrant Families	19.9%	37.8%	24.6%	10.1%	16.9%	20.3%	38.7%	31.9%	100.0%
Lone mother families	38.3%	52.3%	22.5%	11.9%	15.1%	18.2%	24.1%	17.6%	100.0%
Rural Families	12.7%	32.5%	32.2%	17.6%	15.7%	18.8%	39.4%	31.0%	100.0%
Official Language Minority Families	19.9%	42.0%	32.9%	18.6%	10.4%	15.3%	36.8%	24.1%	100.0%
All families combined	18.8%	40.8%	31.2%	13.7%	14.0%	15.9%	35.9%	29.6%	100.0%

The use of regulated care has more than doubled from 18.8% of the overall preschool population to 40.8%. The use of care by a relative has increased by a couple of percentage points to 15.9%. However, the use of unregulated care by a non-relative has plummeted from being used by nearly one-third of all children in the mid-1990's to being used by about one in seven children now in the years before formal schooling begins. The use of exclusively parental care has also decreased substantially for these families with an employed or studying mother; nearly 36% of families used parental care in the mid-1990's while close to 30% use it today. Table 5 shows that this exact same pattern of change (dramatic increases in regulated care, some increase in relative care, substantial reductions in both non-relative care and parental care) is true for immigrant, lone mother, rural and official language minority families.

One might imagine that these trends over the 12 years from 1994-5 to 2006-7 have been dominated by what has happened in Quebec. In 1997, Quebec transformed its child care and family policies to place strong emphasis on providing inexpensive, educational, regulated child care for families who want to use it. Initially, regulated centre-based and family-home child care was made available at $5 per day (or about $1,300 per year) for older preschool children. Over several years, eligibility spread to younger and younger children (but the price rose to $7 per day (or about $1,800 per year). Regulated school-aged child care is also available at a similar price. The net effect, calibrated in a number of studies discussed in the literature review, has been dramatic increases in the use of regulated care in Quebec, and increases in labour force participation and hours of work amongst mothers with young children.

Table 7 below confirms these dramatic changes in child care use patterns in Quebec. The use of regulated care has nearly tripled from 24% of the overall preschool population to 71%. The use of care by a relative has dropped by more than half to 6.3%. The use of unregulated care by a non-relative has nearly disappeared (falling from about 31% to less than 6% of all families). The use of exclusively parental care has also decreased substantially for these families with an employed or studying mother; nearly 32% of families used parental care in the mid-1990's while only about 17% use it today. These patterns hold true for all of the four population groups in Quebec with only one exception: official language minority families have increased their use of care by a relative from 9% to 12% of primary care arrangements over this period.

Table 7
Comparison of Patterns of Use of Different Types of Child Care by Population Groups and Total Child Population with Employed or Studying Mothers, 1994-95 and 2006-07 – Quebec Only

Notes: For each of the population groups, a Pearson Chi-Square test finds that its pattern of child care use is significantly different (at .05) from the pattern of use by those not in the population group.
In this table, "all families combined" refers to all families in Canada with preschool children of employed or studying mothers. Immigrant, lone mother, rural and official language minority families are, of course, part of this total.

	Regulated Care		Unregulated Non-relative		Care by a Relative		Exclusively parental care		Total
	1994-5	2006-7	1994-5	2006-7	1994-5	2006-7	1994-5	2006-7	
Immigrant Families	39.6%	74.0%	16.9%	4.5%	11.1%	8.1%	32.4%	13.4%	100.0%
Lone mother families	44.8%	78.9%	12.6%	4.8%	18.7%	5.1%	23.9%	11.2%	100.0%
Rural Families	15.8%	59.4%	29.9%	9.8%	15.9%	9.0%	38.5%	21.9%	100.0%
Official Language Minority Families	15.8%	62.7%	36.2%	9.8%	8.9%	12.2%	39.2%	15.2%	100.0%
All families combined	24.0%	71.0%	30.9%	5.5%	13.4%	6.3%	31.7%	17.1%	100.0%

Table 8 below shows the comparison between the patterns of child care use in 1994-5 and 2006-7 for the rest of Canada (outside Quebec). The somewhat surprising conclusion that emerges from this data is that the change in child care use patterns is not at all confined to Quebec. In the rest of Canada, over this 12-year period, the use of regulated care has come close to doubling in percentage (from 17.3% to 31.1%), with substantial increases for immigrant, lone mother, rural and official language minority families. The use of care by a relative has risen by nearly 5 percentage points across the whole population (and a little bit more than that in each of our population groups). The use of unregulated care by a non-relative has been cut in half across the whole population (and substantially in each of the four population groups). The use of exclusively

parental care has declined by close to 4 percentage points overall and that is approximately true for each of our four population groups.

Table 8
Comparison of Patterns of Use of Different Types of Child Care by Population Groups and Total Child Population with Employed or Studying Mothers, 1994-95 and 2006-07 – Rest of Canada Only

	Regulated Care		Unregulated Non-relative		Care by a Relative		Exclusively parental care		Total
	1994-5	2006-7	1994-5	2006-7	1994-5	2006-7	1994-5	2006-7	
Immigrant Families	17.2%	29.1%	25.6%	11.4%	17.7%	23.2%	39.5%	36.3%	100.0%
Lone mother families	37.1%	46.0%	24.4%	13.5%	14.4%	21.4%	24.2%	19.1%	100.0%
Rural Families	11.7%	22.7%	32.9%	20.5%	15.6%	22.4%	39.7%	34.4%	100.0%
Official Language Minority Families	21.3%	31.8%	31.8%	22.9%	10.9%	16.8%	36.1%	28.5%	100.0%
All families combined	17.3%	31.1%	31.3%	16.3%	14.2%	19.0%	37.2%	33.6%	100.0%

Notes: For each of the population groups, a Pearson Chi-Square test finds that its pattern of child care use is significantly different (at .05) from the pattern of use by those not in the population group.
In this table, "all families combined" refers to all families in Canada with preschool children of employed or studying mothers. Immigrant, lone mother, rural and official language minority families are, of course, part of this total.

The NLSCY started collecting child care use data in 1994-95 and has collected data every two years until the current Cycle 7 in 2006-7. There are therefore three cycles of data from the 1990's (1994-95, 1996-7 and 1998-9) and four cycles of data from the first decade of the 21st century (2000-1, 2002-3, 2004-5 and 2006-7). The sample size for each individual cycle would not allow us to do

detailed breakdowns of determinants of changes in child care use by age of child, which we do in Appendix B. Further, there might be some concern that the particular cycles chosen to show a comparison (Cycles 1 and 7) were affected by unique factors and did not truly reflect underlying changes in child care use patterns. As a result, in some of the tables in Appendix B, we have chosen to compare the child care use patterns in the first three cycles (the 1990's) to the patterns in the final four cycles (the 2000's). The data is weighted to population totals, combined across cycles and then readjusted to reflect the average population numbers of children in one cycle. The picture presented in those tables is completely consistent with the one described in this section.

CHANGES OVER TIME IN THE HOURS OF CHILD CARE USED

Table 9 compares the amounts (weekly hours) of non-parental child care used by our different population groups and by the overall group of preschool children of employed and studying mothers in Canada. In this table, the comparison is between the 1990's (average across the first three cycles) and the 2000's (average across the latter four cycles).

Some families use "zero hours" of non-parental child care; in other words they use exclusively parental care. The bottom two rows of the table show the distribution of weekly non-parental child care hours for all families combined. Comparing these two rows, we can see that there have been only modest changes in aggregate in the distribution of hours. There is a drop of several percentage points in the proportion using exclusively parental care (i.e., zero hours), but the proportions using other amounts of hours of care have not changed much over this period. Given the dramatic increases in the use of regulated care discussed above, this is somewhat surprising.

Similarly, there has been a modest drop in parent-only care (zero hours) and very little other change elsewhere in the hours of care for immigrant families. For our other population groups – children in lone mother families, rural families and official language minority families – there has been a drop of 4 to 6 percentage points in the proportion using zero hours of non-parental child care. In each case, there has been a modest rise in care for 1-20 hours. The biggest change from the 1990's to the 2000's for all three of these population groups has, however, been a rise in the proportion of these children cared for in the two categories making up 30 hours or more per week.

Note that, because Cycle 7 of the NLSCY was the first cycle to ask questions about expenditure on child care services, there is no completely comparable evidence that allows us to examine the differences in child care spending over time by immigrants, lone mothers, rural families and official language minority families.

Table 9
Changes in the Number of Hours per Week of Non-Parental Child Care Used By Different Population Groups In Canada For Preschool Children With Employed Or Studying Mothers, Comparison of Patterns in the 1990's and the 2000's

Type of Family	Time Period	Zero Hours	1-19.9 Hours	20-29.9 Hours	30-39.9 Hours	40 Hours or more	Total
Immigrant Families	**1990's**	37.5%	15.6%	11.2%	11.4%	24.3%	100.0%
	2000's	35.5%	16.5%	12.2%	11.1%	24.7%	100.0%
Lone mother families	**1990's**	25.1%	12.4%	14.4%	16.4%	31.7%	100.0%
	2000's	18.4%	14.0%	14.6%	17.2%	35.7%	100.0%
Rural Families	**1990's**	38.3%	19.9%	12.9%	10.4%	18.5%	100.0%
	2000's	31.0%	21.1%	13.7%	14.2%	19.9%	100.0%
Official Language Minority Families	**1990's**	32.8%	18.1%	12.6%	13.0%	23.5%	100.0%
	2000's	27.6%	20.4%	10.5%	13.8%	27.8%	100.0%
All families combined	**1990's**	33.4%	17.6%	13.4%	12.0%	23.5%	100.0%
	2000's	30.3%	18.6%	13.5%	13.2%	24.3%	100.0%

Notes: For lone mother, rural and official language minority families, a Pearson Chi-Square test finds that its pattern of hours of child care use is significantly different (at .05) from the pattern of use by those not in the population group. The chi-square test finds no significant difference in the hours of child care use for immigrant and non-immigrant families.
In this table, "all families combined" refers to all families in Canada with preschool children of employed or studying mothers. Immigrant, lone mother, rural and official language minority families are, of course, part of this total.

CHANGES OVER TIME IN CHILD CARE EXPENDITURES

Cycle 7 of the NLSCY was the first cycle to record information on weekly child care expenditures. As a result, we cannot use the NLSCY to chart the change in child care spending over time. The other main source of data on child care spending is the Survey of Household Spending (SHS). However, the SHS collects data on child care for all children in the family (rather than for a single child) and does not have detailed information about the type of child care used, nor about the four population groups of interest to our study, making detailed

analysis of child care expenditures impossible. Further, the SHS has data on annual child care expenditures, whereas the NLSCY provides data on weekly expenditures. With these caveats, we can nonetheless use the SHS data to get a sense of the dramatic changes over time in overall spending on child care arrangements. The table below is from Cleveland, Forer, Hyatt, Japel and Krashinsky (2008), using SHS data for all years except 1987, when data are from the Canadian National Child Care Survey.

Table 10
Average Annual Spending on Child Care for Families with Preschool Children and Employed Mothers, Canada excluding Quebec, 1987-2005, in constant dollars

Year	Families spending zero on child care (%)	Families spending $3,000 or more annually (%)	Average expenditure on child care, including families with no expenditures	Average expenditure on child care of families with positive expenditures	Child care spending as % of mother's earnings	Child care spending as % of family earnings
1987*	38.6	23.3	$1,600	$2,600	13.4	5.5
1997	31.7	28.8	$2,128	$3,116	24.1	7.7
1998	31.0	27.6	$2,271	$3,294	22.9	8.6
1999	33.7	31.9	$2,280	$3,437	21.9	8.4
2000	30.8	30.3	$2,304	$3,331	23.4	10.3
2001	38.6	29.7	$2,184	$3,558	22.0	9.1
2002	34.7	29.5	$2,308	$3,533	24.4	7.0
2003	37.9	30.0	$2,377	$3,824	19.0	7.3
2004	36.7	30.4	$2,346	$3,704	23.7	6.0
2005	38.6	33.3	$2,757	$4,483	28.4	7.9

Notes: * Figures for 1987 are for all of Canada including Quebec. Since this is from before the Quebec child care reforms of 1997, the figures are broadly comparable to those in the rest of the table. Figures for average expenditure in columns four and five have been adjusted to reflect 2005 prices using the Consumer Price Index. These figures refer to families having positive expenditures.
Sources: Statistics Canada, Canadian National Child Care Survey (1988) for annual data from 1987, Public User File of Survey of Household Spending, 1997 through 2004.

Source of this table: Cleveland et al, 2008

Table 13 shows, with minor exceptions, a steady rise in the constant dollar annual expenditures of families on child care (the table excludes Quebec). The average for those families with positive expenditures in 2005 was nearly $4,500, according to SHS, up from $2,600 in 1987 or about $3,100 in 1997. These figures compare to the mean value of nearly $100 per week in 2006-7 according to Cycle 7 of the NLSCY. The $100 per week figure includes families in Quebec, most of whom would have lower expenditures.

Explaining Differences in the Child Care Use Patterns of Population Groups

There are differences in the patterns of child care use across our four population groups, and in comparison to the population as a whole. Lone mother families and official language minority families are less likely to use care exclusively by parents (and more likely to use regulated care); immigrant and rural families are more likely to use parental care (and less likely to use regulated care). Lone mother families and official language minority families have a higher proportion than the overall population using more than 30 hours of non-parental care per week. However, this is also true of immigrant families. Perhaps surprisingly, immigrant families are the only population group with a higher proportion than the

overall population spending $101 or more every week on non-parental child care.

How can we explain these systematic variations? In particular, are these differences due largely to cultural or preference differences associated with the nature of these population groups (e.g., the distinct preferences of immigrant families, or rural families), or are these differences explained largely by the demographic (e.g., income, education, work hours) differences between families in these different population groups? Or are these differences associated with variations in the availability of different types of child care for these population groups? We can make progress in exploring these explanations in a number of ways.

The first thing to do is to look at underlying mean differences in demographic and other variables for our population groups. Tables in that Appendix indicate that there are, indeed, some substantial differences in demographic and other variables across population groups. Table A-1 refers to categorical variables and Table A-2 refers to continuous variables for each of the population groups. Some outcome variables are included in these tables (weekly child care expenditure, hours of care, number of arrangements).

For instance, immigrant families are much less likely than non-immigrant families to be headed by a single mother (7% vs. 12.5%), are more likely to have a mother with a university education (44.4% vs 36.6%), are more likely to have household income in the bottom two quintiles and mother's income in the lowest quintile (but also immigrant families are more likely to have mother's income in the highest quintile). Further, immigrant families are more likely to be rated as low-functional on the Family Rating Scale, less likely to be characterized by positive parenting and more likely to have parenting that is ineffective. Naturally, these demographic and other differences between immigrant families and non-immigrant families may lead to different child care decisions (type, hours, multiple use, expenditures), and may affect the development of children in immigrant families.

It is worth pointing out some of the demographic and other differences for other population groups (in comparison to the aggregate of families not in that population group). Lone mother families are more likely than couple families to be employed more than 40 hours per week (36.2% vs. 34.3%), and much more likely to have no post-secondary education (34.7% vs. 16.4%) and much less likely to have completed university (14.7% vs. 41.6%). Naturally enough perhaps, they are very much more likely to have household income in the lowest quintile (72.1% vs. 12.8%). Even if we consider only the mother's income, lone mother families are more likely to be in the lowest quintile (30.9% vs. 18.2%) and much less likely to earn $48,000 or above (9.2% vs. 20.4%). Fewer lone mothers are self-employed (4.4% vs. 12.1%), more are students (12.7% vs. 3.7%). Further, lone mother families are more likely to be rated as low-functional on the Family Rating Scale (30.9% vs. 13.5%), less likely to be characterized by positive parenting (82.5% vs. 86.4%) and more likely to have

parenting that is ineffective (13.9% vs. 10.2%).

Rural families have substantial differences from urban families. In rural areas, there are fewer single parents (9.7% vs. 11.7%), there are more mothers working less than 20 hours per week (18% vs. 12%), there are more mothers with no post-secondary education (23.7% vs. 17.9%) and fewer with a university degree (25.1% vs. 40.1%). Incomes are lower in rural areas, whether we are considering household incomes ($68,490 vs. $85,720) or mother's income ($24,520 vs. $32,320). Rural families are proportionately more likely to be in the Atlantic Provinces (16.1% vs. 5.7%) and less likely to be in Ontario (26.6% vs. 41.0%). Mothers in rural families are more likely to be self-employed (17.7% vs. 10.4%).

Official language minority families have, perhaps, fewer dramatic differences from families who are not part of an official language minority. However, there are still some notable divergences. There are fewer single parent families amongst official language minorities (6% vs. 11.7%), fewer such mothers work less than 20 hours per week (7.2% vs. 13.1%), more work 30-39 hours (37.7% vs. 32%). More mothers from official language minority families have a university degree (46% vs. 37.9%), household incomes ($97,130 vs. $82,920) and mothers' incomes ($37,160 vs. $31,010) tend to be higher. There are proportionally more official language minority families in the Atlantic Provinces (15.4% vs. 6.3%) and in Quebec (33.2% vs. 23.6%) and many fewer in the Western provinces (15.2% vs 30.4%).

Regression Evidence

Type of Child Care

Regression analysis is particularly useful for assessing the reasons for differences in the child care use patterns of different families. There are, potentially, a very large number of factors (incomes, child age, employment hours, work shift, price of care, membership in a particular population group, etc.) that can influence decisions to use a particular type of child care rather than another (and the decisions about hours of care and expenditure on child care). Regression analysis estimates the influence of each of these factors holding the other factors constant. Therefore, regression analysis allows us to separate out the effects of each factor in what is a complicated decision for each family.

Table 11 provides a regression analysis of variables that may be associated with the decision about the use of a particular type of child care as the primary type of care while the mother is employed or studying. There are four distinct types of care. Because the dependent variable takes this categorical form, we estimate a logit (a polychotomous logit or multinomial logit). The regression estimates the influence of different factors on the odds of using one type of care rather than another. In this regression, exclusively parental care is the reference category, so the regression coefficients in the table refer to the influence of different variables on the odds of, for instance, using regulated care rather than exclusively parental care. The odds ratio is the ratio of the probabilities of using

one type of care rather than another.

So, in Table 11, if we look at the effects of mother's annual income (measured in tens of thousands of dollars), we can see that a one-unit increase in mother's annual income (i.e., $10,000) would multiply the odds of using regulated care rather than parental care by 1.116. This effect is positive and significant, so we could say that mother's income is associated with an increased probability of using regulated care. Looking across the row, we can see that increased mother's income is also associated with increased odds of using non-relative care and care by a relative, rather than exclusively parental care. These multiplicative effects are somewhat smaller than the effect on regulated care.

To see how these results in Table 11 can be interpreted, look at the mother's work hours variables part way down the first column of figures (i.e., the one that refers to the odds of using regulated care rather than care by a parent). Mother's work hours is a categorical variable with five categories: mother works 40 hours or more, mother works 30-39 hours, mother works 20-29 hours, mother works less than 20 hours, and mother is a full-time student. Mother works less than 20 hours is the reference category for this variable.

In Table 11, the estimated coefficient for mother working 40 or more hours is shown as 2.789, mother works 30-39 hours is shown as 3.648 and mother works 20-29 hours is shown as 2.779. The coefficient if mother is a student is 8.455. All of these coefficients are shown as being statistically significant (** = .05 and * = .10). We can interpret these as meaning that if the mother works 40 or more hours rather than being in the reference category, the odds that her young child will use regulated child care rather than parental care will be nearly three times as great (multiplied by a factor of 2.789). If, on the other hand, she works 30-39 hours, the probability that she will use regulated care rather than parental care will increase by close to four times (the odds will be multiplied by 3.648). If the coefficient shown in table 10 is less than one, it means that the odds are multiplied by a number lower than one (the odds are reduced). So, in this table, you should look to see which coefficients are greater than one and which are less than one. Coefficients close to one will not change the odds very much. This table, therefore, gives us a much better sense of the magnitude of effect of different factors on the use of different types of care.

You do have to be careful in drawing quick conclusions from this table; a small change in a big odds ratio may be a fairly big change, and vice versa. For instance, since regulated care is used by more children, a smaller change in the odds ratio for regulated care may be as important as a larger change in the odds ratio for unregulated, non-relative care.

The other issue of interpretation is causality. Inevitably, one wants to interpret the relationships between the listed variables and the use of different types of child care as causal relationships. After all, the decision to include various factors in the regression was based on the possibility of uncovering causal relationships. However, some of the relationships are not directly causal. So, for

instance, mother's work hours could be said to determine the odds of using different types of child care. But it might be just as true that the availability or preference for certain types of child care was determinative of the hours that a mother chose to work. The regression shows associations; we may or may not believe these are causal relations, but the regression does not prove causality. Further, we know that the characteristics of the types of child care available to the family will have an influence on their decisions, but the NLSCY does not have explicit objective measures of price, convenience and quality of care. In some cases (living in Quebec and being a lone mother are two good examples), the factors in our regression will have their effects partly because they are correlated with "price" – a very important omitted variable. So, in Table 11, the measured effect of living in Quebec (which multiplies the odds of using regulated care by a factor of about 4) is probably mostly due to the widespread availability of inexpensive regulated child care in Quebec. And the measured effect of being a lone mother (which multiplies the odds of using regulated child care by a factor of nearly 2) is at least partly due to the eligibility of a significant number of employed and student lone mothers for child care subsidies linked to the use of regulated care.

FACTORS ASSOCIATED WITH THE TYPE OF CHILD CARE USED

Table 11 provides considerable information about the types of families using different types of child care. For instance, all else held equal, families with higher income earned by the mother are more likely to use non-parental types of child care - particularly regulated care. The relationship between child care use and work hours is strong. Being employed for 20 hours or more per week more than doubles the odds of using either type of non-family child care rather than parental care, and also has a positive impact on the odds of using care by a relative.

Mother's education above the high school level increases the odds of using regulated care by about 50%, and either college or university completion also increases the odds of using unregulated non-relative care. Living in Quebec has, as might be expected, a very strong impact (multiplying the odds by 3.930) on the odds of using regulated care. This is largely a price effect, rather than geographic, because the price of regulated care is much lower in Quebec than other provinces. Mother's employment shift is also strongly related to type of care used with day shift and even rotating or irregular shift (vs. evening or night shift) increasing the odds of using non-parental types of care.

Age of the child is generally important and statistically significant in affecting the odds of using different types of child care. Being less than one year of age reduces very dramatically the odds of using any type of care other than parental (not surprising, given the widespread eligibility and popularity of up to one year of

Table 11
Determinants of Child Care Use Patterns: Effects on Child Care Odds Ratios of Variables Associated with Primary Type of Child Care Used by Children 6 months – 5 years, with Mother Employed or Studying in Canada, 2006-7 (Cycle 7, NLSCY)

Variable Name	Regulated Care vs. Parental Care	Unregulated Care by Non-relative vs. Parental Care	Care by Relative vs. Parental Care
Population Groups			
Lone mother family	1.989**	2.163**	2.860**
Family is immigrant family	.883	.620**	1.535**
Family lives in rural area	.844	1.492**	1.468**
Official language minority family	.951	1.415**	1.108
Child Characteristics			
Child is 0 years of age (less than 1)	.044**	.073**	.114**
Child is 1 year of age	Reference Category	Reference Category	Reference Category
Child is 2 years of age	.968	.740**	.631**
Child is 3 years of age	1.570**	1.095	.723**
Child is 4 years of age	1.036	.806	.680**
Child is 5 years of age	.590**	.620**	.578**
Number of children 0-17 = 3 or more	.245**	.392**	.188**
Number of children 0-17 = 2	.501**	.602**	.380**
Number of children 0-17 = 1	Reference category	Reference category	Reference category
Child is female (girl)	.857**	.895	.769**
Birth order of child = 3rd or higher	1.448**	1.561**	2.764**
Birth order of child = 2nd	1.414**	1.435**	1.985**
Child is first born child	Reference category	Reference category	Reference category
Child's birthweight (kilos)	1.019	.947	.886*
Mother's Employment Characteristics			
Work hours >= 40	2.789**	3.120**	1.326**
Work hours 30-39	3.648**	3.981**	1.691**
Work hours 20-29	2.779**	3.313**	1.636**
No work hours; student only	8.455**	3.516**	.807
Work hours < 20	Reference category	Reference category	Reference category
Moth. Day shift	5.240**	2.948**	1.994**
Moth. Day shift + wknds	3.379**	2.459**	1.990**
Moth. Evening or night shift	Reference category	Reference category	Reference category

Moth. Rotating or irregular shift	2.758**	1.956**	1.466**
Mother is self-employed	.329**	.332**	.312**
Family Characteristics			
Mother's annual income ($ 10,000)	1.116**	1.105**	1.094**
Other household income ($ 10,000)	1.010	1.020**	.970**
Mother has university degree	1.386**	1.809**	.951
Mother has completed college	1.276**	1.457**	1.048
Mother- some post-secondary	1.287**	.958	1.226
Mother - no post-secondary	Reference category	Reference category	Reference category
Blended family	1.623*	1.093	.632
Mother's depression score 0-11	Reference Category	Reference Category	Reference Category
Mother's depression score 12-23 (about 6% of all mothers)	1.179	1.172	.884
Mother's depression score 24-36 (about 1% of all mothers)	.178**	.154**	.285**
Family is low-functional	1.371**	.968	1.085
Parenting is positive	.613**	.787*	.894
Parenting is ineffective	.735**	.757*	.831
Age of mother at birth	1.014*	1.012	.982**
Western Provinces	.741*	.612**	.493**
Ontario	.710**	.560**	.617**
Quebec	3.930**	.448**	.420**
Atlantic Provinces	Reference category	Reference category	Reference category
Number of observations (n)	6859		
- 2 Log Likelihood	1467		
Pseudo R-squared	Cox and Snell .361	Nagelkerke .391	McFadden .173
Chi-square	3076		

Notes: * statistically significant at .10
** statistically significant at .05

parental leave)[7]. Being 3 years of age (rather than being 1 year of age) multiplies by about 1.5 the odds of using regulated care, and reduces the odds (multiplies the odds by .723) of using care by a relative rather than parental care.

Two factors are somewhat surprising in their effects on child care decisions: gender and birth order. Being a girl is statistically significantly associated with the use of exclusively parental care rather than regulated care, and rather than care by a relative. We can see in Table 11 that having a larger number of children at home reduces the probability of using any type of care other than parental care. However, when we control for the number of children in the family, then birth order matters. Being a second child or third child (rather than a first-born child) increases significantly the odds of using any other type of care rather than parental care. It is unclear what produces either of these (gender and birth order) effects.

CHILD CARE USE BY POPULATION GROUPS

Our particular interest in these regressions is to see what effect being in a particular population group has on the type of child care used. The regressions control for the effects of a wide range of factors (such as mother's education, mother's work hours, age of child, number of children, etc.) that vary dramatically across these population groups. As a result, the regression allows us to estimate the net effect of being in a population group, controlling for these other variables. These measured effects may be due to differences in preferences across population groups, but may also reflect differences in price (for some lone mother families), in access to regulated care (for rural families)

Being a lone mother family approximately doubles or more than doubles the odds of using the various types of non-parental child care. Being an immigrant family decreases the probability of using unregulated care by a non-relative instead of parental care, but it increases the odds of using care by a relative. Being a rural family increases the odds of using non-relative care, rather than parental care, and also the odds of using care by a relative. Being an official language minority family has, on its own, a significant positive effect on the odds of using care by a non-relative rather than parental care.

One of the peculiarities of the multinomial logit model is that significance patterns are measured relative to a reference category, and changes in that reference category can uncover statistically significant relationships that might otherwise be missed. In Table 12, we present the effects of our four population groups on the choice of different types of child care when unregulated non-relative care is made into the reference category (rather than exclusive care by a parent). In this table,

[7] Remember that mothers who have a job from which they are on maternity or parental leave are considered to be currently employed and are therefore included in the population of employed or studying mothers for the purposes of this paper.

we only show the effects of these population groups, but in fact the full regression uses variables identical to those listed in Table 11.[8]

Table 12
Effects of Population Group Membership on Child Care Use Patterns, with Unregulated Care by a Non-Relative as the Reference Category, 2006-7

Variable Name	Regulated Care vs. Unregulated Non-relative Care	Care by Relative vs. Unregulated Non-relative Care	Care by Parent Only vs. Unregulated Non-relative Care
Population Groups			
Lone mother family	.919	1.322	.462**
Family is immigrant family	1.423**	2.475**	1.612**
Family lives in rural area	.565**	.984	.670**
Official language minority family	.672**	.783	.707**

Notes: * statistically significant at .10
** statistically significant at .05

From Table 12, we can see that being a lone mother family does not significantly affect the odds of using regulated care rather than care by a non-relative, or the odds of using care by a relative. However, being a lone mother does significantly reduce the probability of using parental care instead of care by a relative. The results for immigrant families were not obvious from Table 11. Being in an immigrant family significantly increases the odds of using anything other than care by a non-relative. On the other hand, living in a rural area decreases the odds of using regulated care rather than care by a non-relative and also decreases the odds of using parental care rather than care by a non-relative. The pattern with official language minority families is similar to rural families. Being an official language minority family decreases the odds of using regulated care rather than care by a non-relative and also decreases the odds of using parental care rather than care by a non-relative

Hours of Child Care

Table 13 below shows effects of different factors on the use of different categories of hours of non-parental child care use per week (the NLSCY does not provide data on the hours of parental care used to offset parental work patterns). There are five categories of hours. The reference category is zero hours of non-parental care (i.e., exclusive use of parental care while mother is employed or studying). The four columns of figures in Table 13 refer to the use

[8] Regression results are available from the authors on request.

Table 13
Determinants of Hours of Non-parental Child Care Used: Effects on Child Care Odds Ratios of Variables Associated with Number of Hours of All Types of Non-Parental Child Care Used by Children 6 months – 5 years, with Mother Employed or Studying in Canada, 2006-7 (Cycle 7, NLSCY)

Variable Name	40 hours or more vs. no non-parental care	30 to 39 hours vs. no non-parental care	20 to 29 hours vs. no non-parental care	1 to 19 hours vs. no non-parental care
Population Groups				
Lone mother family	2.776**	2.663**	2.183**	1.561
Family is immigrant family	1.394**	1.087	.868	.787**
Family lives in rural area	1.051	1.076	1.075	1.285**
Official language minority family	1.215	1.043	.787	1.239
Child Variables				
Child is 0 years of age	.030**	.059**	.042**	.178**
Child is 1 year of age	Reference Category	Reference Category	Reference Category	Reference Category
Child is 2 years of age	.736**	1.051	.619**	.898
Child is 3 years of age	.854	1.518**	.953	1.622**
Child is 4 years of age	.364**	.889	.882	1.664**
Child is 5 years of age	.055**	.247**	.623**	2.176**
Number of children 0-17 = 3 or more	.182**	.116**	.216**	.422**
Number of children 0-17 = 2	.448**	.315**	.445**	.604**
Number of children 0-17 = 1	Reference category	Reference category	Reference category	Reference category
Child is female (girl)	.781**	.714**	.928	.866**
Birth order of child = 3rd or higher	2.668**	3.514**	1.625**	1.250
Birth order of child = 2nd	1.922**	2.234**	1.447**	1.318**
Child is first born child	Reference category	Reference category	Reference category	Reference category
Child's birthweight (kilos)	.894	.906	1.108	.974
Mother's Employment Variables				
Work hours >= 40	15.897**	5.361**	2.026**	.741**
Work hours 30-39	11.207**	11.091**	3.661**	1.076
Work hours 20-29	2.869**	3.945**	6.363**	1.325**
Student only	6.671	9.238**	12.273**	1.285
Work hours < 20	Reference category	Reference category	Reference category	Reference category
Mother on day shift	6.406**	3.670**	5.036**	1.713**
Mother on day shift and weekends	3.284**	2.939**	3.951**	1.766**
Mother on evening or night shift	Reference category	Reference category	Reference category	Reference category
Mother on rotating or	1.892**	1.869**	3.297**	1.573**

Mother on rotating or irregular shift	1.892**	1.869**	3.297**	1.573**
Mother is self-employed	.108**	.331**	.352**	.486**
Family Variables				
Mother's Annual Income ($10,000)	1.127**	1.116**	1.127**	1.094**
Other Household Income ($10,000)	1.041**	1.010	1.000	.980
Mother has university degree	.943	1.077	1.534**	1.628**
Mother has completed college	.831	1.132	1.499**	1.447**
Mother has some post-secondary	1.090	1.083	1.209	1.369**
Mother has no post-secondary education	Reference category	Reference category	Reference category	Reference category
Non-biological parent	2.036**	1.045	.890	1.061
Mother's depression scale = 12-23 (6% of all mothers)	1.086	.933	.860	1.189
Mother's depression scale = 24-36 (1% of all mothers)	.171**	.246**	.173**	.173**
Family is low-functional	1.239*	1.111	1.411**	1.088
Parenting is positive	.503**	.610**	.713**	.962
Parenting is ineffective	.708**	.760*	.756**	.825
Mother's age at child's birth	1.008	.983*	1.014	1.002
Western Provinces	.419**	.639**	.611**	.693**
Ontario	.478**	.564**	.637**	.749*
Quebec	1.911**	2.337**	1.085	1.328
Atlantic Provinces	Reference category	Reference category	Reference category	Reference category
Number of observations (n)	6859			
- 2 Log Likelihood	17450			
Pseudo R-squared	Cox and Snell .448	Nagelkerke .468	McFadden .189	
Chi-square	4073			

Notes: * statistically significant at .10
** statistically significant at .05

of more than 40 hours of non-parental child care per week, the use of 30-39.9 hours of child care per week, the use of 20-29.9 hours of child care per week, and the use of 1-19.9 hours of child care per week. The dependent variable is therefore categorical and a logit regression is used to estimate the association of different factors with the odds of using a particular number of hours of non-parental child care rather than using exclusively parental care. As with Table 11, the figures in Table 13 refer to the effects on the odds ratios. For instance, the first column of figures refers to effects on (more accurately, associations with) the odds ratio of using non-parental child care for more than 40 hours per week vs. using no non-parental child care.

FACTORS ASSOCIATED WITH THE HOURS OF CHILD CARE USED

Mother's income and father's income are associated with hours of child care used. Both increase the odds of care for more than 40 hours per week rather than zero hours, and mother's income also increases the odds of 30-39 hours, 20-29 hours or 1-20 hours. The odds of each of these is increased by 9%-12% for each increase of $10,000 in mother's income, all else held constant. Controlling for income, hours of mother's employment is statistically significant and powerful in affecting the hours of child care used. For instance, mother's work hours of 40 or more per week (in comparison to employment of less than 20 hours per week) increases the odds of using more than 40 hours of child care per week more than fifteen-fold. When the mother works 30-39 hours, this probability is increased over 11 times, but working 20-29 hours per week only increases the odds of using 40 hours or more of child care less than three-fold. In general, the number of work hours of the mother dramatically changes the odds of using each of the categories of hours of child care. For instance, being a student increases the odds of using 20-29 hours by the largest amount, increases the odds of using 30-39 hours somewhat less, and has no significant effect on the odds of using the other categories of hours of child care.

All else controlled, university or college education increases the probability of using 20-29 hours or less than 20 hours, but not the odds of using more than 30 hours of care. Living in the western provinces reduces the probability of using any category of hours of non-parental care. Living in Quebec approximately doubles the odds of using child care for more than 30 hours per week. Working straight day shift is associated with increased odds of using some non-parental care, with large effects at 20 hours and above. Day shift with weekends increases the odds in similar directions but by a smaller magnitude. Clearly, working evening or night shift (the reference category) reduces the odds of using any hours of non-parental care.

An increased number of children in the household reduces the odds of using any category of positive hours of non-parental care, multiplying the odds ratio by between .18 and .61. Mother's self-employment is a work status that is particularly complementary with the provision of exclusively parental care. Self-employment is significantly associated with a reduced odds ratio of using any hours of non-

parental child care.

As suggested in the analysis of type of care, girls and boys are different when it comes to hours of care. All else held equal, being a girl is associated with a reduced probability of using either 30-39 hours or 40 hours or more of non-parental care, and also a reduced probability of using less than 20 hours of care. Controlling for the number of children in the household, higher birth order (e.g., second-born or third-born) is generally associated with increased hours of non-parental child care, with the effects on hours generally being greater for third-born than second-born children.

CHILD CARE HOURS BY POPULATION GROUPS

Our particular interest in these regressions is to see what effect being in a particular population group has on the number of hours of child care used. The regressions control for the effects of a wide range of factors (such as mother's education, mother's work hours, age of child, number of children, etc.) that vary dramatically across these population groups. As a result, the regression allows us to estimate the net effect of being in a population group on the hours of care, controlling for these other variables.

There is a somewhat surprising effect of immigration status on hours of child care used per week. Based on some results in the literature, one might have anticipated that immigrant status would be associated with a smaller number of hours of non-parental child care used, or with use of parental care. However, immigrant status has two somewhat divergent effects. Immigrant status signficantly increases the odds of using more than 40 hours of child care per week rather than parental care. However, it also decreases the odds of using less than 20 hours per week rather than parental care. This may suggest that immigrant families are a heterogeneous category, which would not be surprising.

All other factors held equal, being a child in a lone mother family increases by close to three-fold the odds of using more than 30 hours per week of child care. Lone mother status also more than doubles the odds of using 20-29 hours of care rather than exclusively parental care. Living in a rural family increases the odds (by about 30%) of using 1-20 hours of care rather than using exclusively parental care. Being in an official language minority family has, on its own, no significant effect on the hours of care used.

Weekly Child Care Expenditure

The final dimension of child care use that we explore using regression analysis is weekly child care expenditures. Cycle 7 of the NLSCY was the first cycle to collect this information. There are two dimensions of child care expenditures that need to be explained. First, there is the decision to spend zero or to have positive expenditures. Zero expenditures are most associated with parental care, but also a considerable amount of care by relatives and some subsidized use of regulated care. The second dimension is the decision about the amount to spend, conditional on spending some positive amount. Table 14, using data from

Table 14
Determinants of Positive Child Care Expenditures: Variables Associated with Changes in the Odds of Having Positive Expenditures on All Types of Child Care for Children 6 months – 5 years, with Mother Employed or Studying in Canada, 2006-7

Variable Name	Positive vs. Zero Expenditures
Population Group Variables	
Lone mother family	1.167
Family lives in rural area	1.072
Family is immigrant family	.764**
Official language minority family	1.234*
Child Variables	
Child is girl	1.088
Child's Birthweight (kilos)	1.074
Child age = 0 years	.074**
Child age = 1 year	Reference Category
Child age = 2 years	1.005
Child age = 3 years	1.313**
Child age = 4 years	1.033
Child age = 5 years	.658**
Birth Order of Child – 3rd child	1.305**
Birth Order of Child – 2nd child	1.317**
Birth Order of Child – 1st child	Reference Category
Number of siblings in family	0.641**
Mother's Employment Variables	
Work hours >= 40	3.071**
Work hours 30-39	3.676**
Work hours 20-29	2.552**
No work hours; student only	4.156**
Work hours < 20	Reference Category
Mother works day shift	2.938**
Mother works day shift + weekends	2.280**
Mother works evening or night shift	1.993**
Mother works rotating or irregular shift	Reference Category
Mother is self-employed	.369**
Family Variables	
Mother's Annual Income ($ 10,000)	1.080**

Other Household Income ($ 10,000)	1.025**
Mother – University Degree	1.229**
Mother - College completion	1.378**
Mother – Some post-secondary education	1.501**
Mother - No post-secondary education	Reference Category
Blended Family	1.457*
Family is low-functional	1.172*
Parenting is positive	.803**
Parenting is ineffective	.859
Mother's depression score 12-23 (about 6% of all mothers)	.982
Mother's depression score 24-36 (about 1% of all mothers)	1.691
Age of mother at birth	1.016**
Western Provinces	.700**
Ontario	.618**
Quebec	2.111**
Atlantic Provinces	Reference Category
Cox and Snell R-Square	
-2 Log Likelihood	7316
Nagelkerke R-square	.327
Number of observations	

Notes: * statistically significant at .10
** statistically significant at .05

Cycle 7 of NLSCY, explores the first of these dimensions – the factors that are associated with having a positive amount of expenditures rather than zero. We estimate this model with a binomial logit, so that the coefficients in the table can be interpreted as the multiplicative effect on the odds ratio of having positive rather than zero expenditures.

Of course, our special interest is in the effect of population group membership, all else held equal, on the odds of having positive child care expenditures. Table 14 shows that being in an immigrant family is associated with a decreased likelihood of having positive child care expenditures (multiplying the odds by about .75). On the other hand, being in an official language minority family increases the odds of having positive expenditures (multiplying by about 1.25). Being in a rural family or a lone mother family has no statistically significant effect on this odds

ratio, once other factors are controlled.

There are a host of other factors that affect the probability of having positive child care expenditures. If the child is aged between zero and one years, the probability of positive expenditures is much less. Being a child of 3 years of age (rather than 1 year of age) is associated with a higher probability of positive expenditures, and being 5 years of age is associated with a lower probability of positive expenditures. Work hours are strongly associated with positive expenditures. Working any amount of hours at or above 20 or more hours per week rather than less than 20 hours increases this probability, as does being a student. Working day shift, day shift and weekends, or evenings or nights increases this probability; being self-employed reduces it. Higher mother's and higher other income are both associated with a greater probability of having positive amounts of child care spending per week; controlling for income, any amount of post-secondary education also increases the probability of having a positive amount of child care expenditures each week. Being from Ontario or the Western Provinces, rather than the Atlantic Provinces decreases the odds of having positive child care expenditures and being from Quebec increases these odds.

Table 15 provides results from two Ordinary Least Squares regressions exploring associations between explanatory variables and the amount of weekly expenditures on non-parental child care. Families spending zero on child care (e.g., exclusively parental care or using a relative who is not paid) are not included in the regression. So this regression seeks to explain child care expenditures amongst those children who have positive expenditures on their child care.

Two different regressions were run on the same set of explanatory variables. In the first case, the dependent variable is the weekly amount of expenditures. In the second case, the dependent variable is the (natural) log of weekly expenditures. Expenditure is a right-skewed variable and large values might therefore have substantial effects on parameter estimates. Using the log of expenditures as the dependent variable reduces this effect. However, interpreting the size of coefficients is easier using the regression of actual weekly child care expenditures. The broad pattern is similar in these two regressions.

Because of the ease of exposition, this discussion will focus on the results shown under the column "Weekly Child Care Expenditures". Each kilo of extra birthweight is associated with an approximate $4.00 decrease in weekly expenditures. It is not clear what explains this relationship. Controlling for other factors (including the hours per week in child care), child's age has strong effects on weekly expenditures. For those who have positive expenditures on children less than one year of age, they will spend on average $19 more per week than if the child was one year of age. However, children older than one will generally cost less (over $9 less at two years of age, over $13 less at 3 years of age and over $15 less at 4 years of age.

Each additional hour of child care per week, other factors constant, increases expenditure by $1.54 per hour. However, that holds constant the mother's work

Table 15
Determinants of Weekly Child Care Expenditures: Variables Associated with Expenditures and the Natural Log of Expenditures on All Types of Non-Parental Child Care for Children 6 months – 5 years, with Mother Employed or Studying in Canada, 2006-7 (zero expenditures on care excluded)

Variable Name	Weekly Child Care Expenditures	Natural Log of Weekly Child Care Expenditures
Population Group Variables		
Constant/Intercept	11.729	3.636**
Lone mother family	7.511	-.0001
Family lives in rural area	-7.243*	-.056*
Family is immigrant family	5.924**	.024
Official language minority family	-3.080	-.017
Child Care Variables		
Number of hours of non-parental child care per week, all types	1.538**	.017**
Number of individual types of child care used per week	-11.329**	-.095**
Child Variables		
Child is girl	2.477	.010
Child's Birthweight (kilos)	-4.324**	-.047**
Child is 0 years of age (less than 1)	18.769**	.080
Child is 1 year of age	Reference Category	Reference Category
Child is 2 years of age	-9.387**	-.061**
Child is 3 years of age	-13.129**	-.098**
Child is 4 years of age	-15.357**	-.104**
Child is 5 years of age	-2.516	.038
Birth Order of Child	-6.561**	-.017
Number of siblings in family	2.192	-.057**
Mother's Employment Variables		
Work hours >= 40	25.965**	.304**
Work hours 30-39	17.212**	.233**
Work hours 20-29	11.219**	.168**

Work hours < 20	Reference Category	Reference Category
No work hours; student only	26.084**	.178**
Mother works day shift	-1.978	.020
Mother works day shift + weekends	6.584	.009
Mother works evening or night shift	Reference Category	Reference Category
Mother works rotating or irregular shift	-1.977	-.011
Mother is self-employed	16.769**	.107**
Family Variables		
Mother's Annual Income ($ 10,000)	5.762**	.035**
Other Household Income ($ 10,000)	3.803**	.023**
Mother – University Degree	9.816**	.098**
Mother - College completion	-2.082	-.046
Mother – Some post-secondary education	-.682	-.033
Mother - No post-secondary education	Reference Category	Reference Category
Age of mother at child's birth	.900**	.007**
Blended Family	-4.468	-.140*
Family is low-functional	10.589**	.021
Parenting is positive	2.398	.026
Parenting is ineffective	-3.950	.017
Mother's Depression Score = 12-23 (6% of all mothers)	-2.808	-.060
Mother's Depression Score = 24-36 (1% of all mothers)	-9.956	-.156
Western Provinces	19.925**	.070*
Ontario	15.487**	.064
Quebec	-59.462**	-.835**
Atlantic Provinces	Reference Category	Reference Category
Adjusted-R-squared	.386	.443
Number of observations (n)		

Notes: * statistically significant at .10
** statistically significant at .05

hours. Increased work hours of the mother also has a strong positive effect on expenditures. Employment of more than 40 hours per week raises expenditure by about $26. Working fewer hours has a smaller, but still very substantial, positive effect on weekly child care spending. For those students who have

positive child care expenditures, they will spend about $26 more per week than mothers working less than 20 hours per week. Mother's income increases the amount spent by about $6 per week for every $10,000 of income. The father's income has a slightly smaller effect (a bit less than $4 for every $10,000 of income). Mother's education below university level has no significant effect. However, mothers with a university education spend over $9 more per week, other factors equal.

Mothers who are self-employed, all else equal, will spend nearly $17 per week more on child care than other similar mothers. This may seem surprising, because many self-employed mothers will use exclusively parental care and spend zero on child care. However, this regression analyzes spending by the spenders. Conditional on spending a positive amount, self-employment is associated with greater child care expenditures of $17 per week (perhaps due to the need for flexible and unusual hours of care).

Naturally enough, location has a big effect on expenditure. Those who live in Quebec are likely to have access to regulated child care at $7 per day, so on average, Quebec families spend $59 less per week than families in the Atlantic provinces. However, those who live in Ontario spend more (over $15 more per week) and so do those who live in the Western provinces (nearly $20 more per week).

Naturally, our special interest is in the effect of membership in particular population groups on the amount of child care spending per week. Lone mother status has no effect, other factors held constant, on weekly child care expenditures (obviously income, child age, hours of work, and hours of child care all have effects). The same is true of being an official language minority family. Living in a rural area, all else constant, reduces weekly child care expenditure by about $7.00 and being from an immigrant family raises expenditure by about $6.00 per week, for those who have positive expenditures.

Conclusions on Child Care Use Patterns

The four population groups of interest – immigrant families, lone mother families, rural families and official language minority families make different child care decisions than other families in Canada. In virtually all of Tables 1 through 4 and 6 through 9, which describe current child care use patterns and changes in child care use patterns, families in each of the four population groups make child care decisions that, on average, are statistically significantly different from decisions made by families that are not in that population group. That includes decisions about the type of child care to use, the hours of child care to use each week, the number of different types of care to use over the course of a week, the amount of spending on child care each week, as well as the changes in the type and hours of care from 1994-95 to 2006-7.

Trying to describe these differences in broad brushstrokes risks missing important details. However, in broad brushstrokes we might say that immigrant families tilt towards the use of parental and relative care for their children and away from non-family care. Lone mothers tilt towards the use of regulated child care or care by relatives rather than parental care or unregulated care by non-relatives. Rural families, whether due to preference or availability, tilt away from regulated care and disproportionately use other types of care. Finally, official language minority families tilt towards regulated care and care by non-relative caregivers and away from family types of care.

We might have expected the stereotypical picture sketched in the paragraph above: lone mothers oriented towards regulated care and away from parental care; immigrant and rural families oriented away from regulated care and towards parent and family care. Taken on its own, the sketch is a misleading summary, however. Between 1994-95 and 2006-7, every one of the four population groups has changed dramatically its patterns of use of types of child care. Immigrant families have nearly doubled the proportion of children using regulated child care over this 12-year period; rural families and official language minority families have more than doubled their use of regulated care. Lone mother families, already strong users of regulated care, have increased their use of it till more than half of all employed and studying lone mothers now use regulated care. For every population group, the use of exclusively parental care has dropped substantially, the use of unregulated care by a non-relative has dropped dramatically, and there has been a noticeable rise in the use of care by relatives. Some of these changes are due to Quebec's 1997 child care reforms, but the patterns of change are strong and obvious in the rest of Canada as well.

There are important differences between population groups in the hours of non-parental child care used each week. Rural families are more likely to use smaller numbers of hours per week. However, immigrant families, lone mother families and official language minority families are disproportionately likely to use 40 hours or more per week. Perhaps surprisingly though, there is little evidence of substantial change in the last 12 years in the hours of care used per week. For each of our population groups there has been a rise in the use of 40 hours or more per week and a decline in the use of zero hours of non-parental care over this period of time, but the change is moderate rather than dramatic.

Child care can be an expensive service for young families to purchase. Even with Quebec's $7 per day care included, the average expenditure per child for those who purchase child care of any type is about $100 per week. However, there is considerable variation across individual families and across population groups in the amounts spent. About 15% of families using non-parental child care spend $0 per week on child care; most of this is provided by relatives. This is disproportionately true for immigrant families and lone mother families. Another 34% of the users of non-parental care spend less than $50 per week (especially true of rural families). This category includes families using Quebec's $7 per day care, some using care by relatives, families receiving child care

subsidies, and families who only use paid child care on a part-time or part-week basis. About three out of ten families spend more than $100 per week purchasing child care for their child. In fact, immigrant families are disproportionately likely to spend this amount and three out of ten official language minority families are spending this amount as well.

Regression Results

Part of the variation in child care decisions by different population groups can be explained by different average incomes, different average child ages, different work patterns of mothers, and so on. Appendix tables show that there are, indeed, substantial average differences on child, mother and family variables across the four population groups.

Further, the regressions presented in Tables 11 through 15 indicate that different child needs, different work and income situations and a wide range of family factors do have very significant effects on the child care decision-making process. Mother's work hours and work shift have particularly large multiplicative effects on the probabilities of choosing one type of care rather than another. Child care decisions also very substantially by child age, with three years of age apparently being the peak for regulated care probability and one year of age the peak for care by non-relative or relative caregivers. The peak for parental care is when a child is less than one year old, but parental care is also very important at five years of age because of the inflexibility of kindergarten hours. Gender, birth order and the number of children in the family all affect parental decisions about type of care, as do incomes, education, province or region and other factors.

Another part of the reason for different child care decisions is that, even when a host of child, mother and family variables are held constant, parents in different population groups will make different child care decisions. These different decisions are partly be due to differences in preferences, of course, but could also be due to the different unmeasured constraints facing these different population groups. Since our data set does not have information on price, quality and availability of different child care options, it is possible that differential price, quality and availability across population groups is the actual source of different decisions by families in different population groups.

POPULATION GROUP EFFECTS

When a wide range of child, mother and family variables are controlled, being a lone mother is strongly and significantly associated with the use of any type of care other than parental care, when the lone mother is employed or studying. Being an immigrant family reduces substantially the probability of using unregulated care by a non-relative rather than parental care, increases the probability of using relative care rather than parental, and increases the probability of using regulated care rather than unregulated care by a non-relative. All else held constant, living in a rural area is significantly associated with using non-relative care or care by a relative, rather than care by a parent. Being an official language minority family increases the odds of using non-relative care

rather than parental, but otherwise these families make child care choices like other families.

Population group membership has some effects on the hours of care, separate from the effects of child, mother and family factors. Being a lone mother substantially increases the odds of using 20 hours or more of child care per week, with the strongest effect at 40 hours and more. Being an immigrant family significantly increases the odds of using 40 hours or more of child care per week, but reduces the odds that the child will use less than 20 hours of non-parental care rather than exclusively parental care. All else held equal, living in a rural area increases the probability of using a small amount of non-parental care (less than 20 hours) rather than using exclusively parental care. Controlling for other factors, there are no significant effects of being in an official language minority family on the hours of child care used.

All else constant, lone mother families and immigrant families are more likely than other families to have zero expenditures rather than positive expenditures on non-parental child care. For those families that do have positive expenditures, being in an immigrant family increases the amount spent per week, while being in a rural family decreases the amount spent per week.

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4. Child Care and Child Development

The fourth of our major research questions asks what the relationships are between the type and hours of child care used and developmental outcomes of children, particularly in these population groups. These developmental outcomes include cognitive development and language development, behavioural, social and emotional development and health outcomes.

Child Outcome Measures

The child development measures included in the NLSCY were chosen on the basis of an extended literature review, development of a research framework on child development and learning, consultations with many experts in Canada and internationally, review of material on many different possible instruments and field testing of the most likely possibilities. The instruments selected for consideration were also reviewed using a number of criteria. The criteria included reliability and validity of the instrument, coverage of domains in the research framework, ability of the instrument to indicate normal development and developmental delays, the ease of administration by lay interviewers and the availability of the instrument in English or French (or ease of translation to French or English). The final decision was strongly influenced by key experts who had a history of providing advice to the NLSCY Team.

In this paper, we analyze sixteen measures of child outcomes from the NLSCY. All of these measures are continuous measures or scales, rather than categorical variables. In Table 16 below, these outcomes are listed and described in the order in which they appear in Tables 18, 19 and 20.

Table 16
Definition of Child Outcome Variables Analyzed

TABLE 18	
PPVT-R	The Revised Peabody Picture Vocabulary Test (PPVT-R) is designed to measure receptive or hearing vocabulary in either English or French. The test is administered by the interviewer directly to children 4 to 5 years of age. The standardized score sets the average score for the population at 100 with a standard deviation of 15. The standardized score allows for comparisons of scores to be made across age groups. A French adaptation of the PPVT–R was developed by the test's authors and Claudia M. Thériault at St. Thomas University in Fredericton, New Brunswick. The French test is called the Échelle de vocabulaire en images de Peabody (EVIP).
Number Knowledge	This test is designed to measure the essential prerequisites for successful school learning in the area of mathematics. In this paper, we consider number knowledge of 4 and 5 year old children. According to Dr. Case's theory, four developmental levels can be distinguished in children's understanding of numbers: predimensional, unidimensional, bidimensional, and integrated bidimensional. Some degree of mastery of each level is required prior to continuing onto the next. Typically the four levels are attained at the ages of 4, 6, 8, and 10. The predimensional level assesses the ability to count by rote and to quantify small sets, using concrete objects. This knowledge is important for the unidimensional level, where children deal with changes in quantity without objects that can be touched or seen. The unidimensional level assesses children's knowledge of the number sequence and ability to handle simple arithmetic problems. To solve the items, children must rely on a 'mental counting line' in their heads. This 'line' integrates their understanding of numbers and quantities. The Number Knowledge test was revised for the NLSCY. The assessment has been made continuous with three levels; some items were revised or dropped to make the test slightly shorter. The test is composed of 22 items. Children are not permitted to use a pencil and paper to answer the questions, which are given orally. Instead, the children must rely on a 'mental counting line,' which integrates the child's understanding of numbers and quantities. Children do have access to the various manipulative aids such as chips and a number card to help solve the problems
Who Am I?	The purpose of the Who Am I? assessment is to evaluate the developmental level of young children from 3 to 7 years of age. For the NLSCY, the assessment is administered to 4- and 5-year-old children. The assessment was developed by Dr. Molly de Lemos and her colleagues at the Australian Council for Educational Research (ACER) and amended with consultation by the NLSCY. The Who Am I? involves copying and writing tasks. The copying tasks in the assessment are designed to assess the child's ability to conceptualize and reconstruct a geometrical shape. The writing tasks assess the ability of the child to understand and use symbolic representations such as numbers, letters and words. The child's ability to complete the tasks depends on many factors including maturity, culture, experiences, and language skills. This type of assessment has been included in measures of intelligence and development over a long period of time. Piaget's research on the development of spatial concepts in young children also provides evidence of the validity of copying tasks as a measure of developmental level.

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Scaled Math Scores	Mathematics Computation Test of the standardized Canadian Achievement Tests, Second Edition (CAT/2). The CAT/2 is a series of tests designed to measure achievement in basic academic skills. The CAT/2 Mathematical Operations Test measures the student's ability to do addition, subtraction, multiplication and division operations on whole numbers, decimals, fractions, negatives and exponents. Problem solving involving percentages and the order of operations are also measured. Since Cycle 5, the short version of the test developed for the purposes of the NLSCY consists of 20 questions at each level. The classical scaled score is derived from standards (norms) established by the Canadian Test Centre (CTC) in 1992. The CTC developed these

TABLE 19	
Emotional Disorder	Children who frequently exhibit feelings or behaviours such as sadness or depression, fear, anxiety, worrying, crying, acting distressed, having trouble enjoying themselves, or being high-strung have emotional problems - referred to by psychologists as emotional-disorder anxiety. These emotional problems are likely to inhibit the children from developing to their full potential. Includes items from the Ontario Child Health Study.
Pro-Social Behaviour	Measure of positive, pro-social behaviours. Questions included from the Montreal Longitudinal Survey and from Ontario Child Health Study
Hyperactivity and Inattention	When children are hyperactive and have short attention spans, their ability to learn or to relate well to others is harmed. Children were identified in the NLSCY as having such problems if they were frequently unable to sit still, they were easily distracted, restless, had trouble sticking to an activity or concentrating, fidgeted, acted impulsively, or could not wait their turn during games or group activities. Montreal Longitudinal Survey
Physical Aggression	Meaure of physical aggression with questions from the Montreal Longitudinal Survey
Indirect Aggression	Commonly known as "troublemakers," children who are indirectly aggressive tend to instigate fights and conflicts among their peers or family members. The measurement of indirect aggression is based on parents' responses to questions in the NLSCY about specific behaviours, including how frequently their child encourages others to dislike or exclude someone, and how often their child says bad things behind another child's back.
Frequency of Nose and Throat Infections	
Health Utility Index	For a child 4 to 5 years old, which is the relevant range for this paper, this measure includes data on the child's physical health – general health, injuries, limitations and chronic conditions, as well as the use of health services and medications. It also includes health status information on topics such as hearing, sight, speech and overall mental well-being. From this information, a Health Status Index (HUI3) is calculated. The HUI3 is a generic health status index that is able to synthesize both quantitative and qualitative aspects of health. The index, developed at McMaster University's Centre for Health Economics and Policy Analysis, is based on the Comprehensive Health Status Measurement System (CHSMS). It provides a description of an individual's overall functional health based on nine attributes: vision, hearing, speech, mobility (ability to get around), dexterity (use of hands and fingers), cognition (memory and thinking), emotion (feelings), pain and discomfort. The scores of the HUI3 embody the views of society concerning health status. Each person's preferences are represented as a numerical value (typically between 0 and 1) for a given health state. (Some of the worse states of health are often given values less than 0, indicating that the individual considers them to be worse than death.) This index is also used by the National Population Health Survey.
TABLE 20	
Ages and Stages – Problem Solving	The Ages and Stages Questionnaires (ASQ) are parent-report instruments, developed by Jane Squires, LaWanda Potter and Diane Bricker, at the University of Oregon, designed to identify infants and young children who show potential developmental problems. The full Ages and Stages Questionnaires comprise 19 questionnaires that cover the age range from 4 to 60 months. Each questionnaire includes roughly 30 items covering five

Ages and Stages – Problem Solving	The Ages and Stages Questionnaires (ASQ) are parent-report instruments, developed by Jane Squires, LaWanda Potter and Diane Bricker, at the University of Oregon, designed to identify infants and young children who show potential developmental problems. The full Ages and Stages Questionnaires comprise 19 questionnaires that cover the age range from 4 to 60 months. Each questionnaire includes roughly 30 items covering five domains of development: 1) Communication: babbling, vocalizing, listening, and understanding 2) Gross motor: arm, body, and leg co-ordination 3) Fine motor: hand and finger co-ordination 4) Problem-solving: doing different activities with objects, drawing 5) Personal–Social: solitary and social play, dressing and feeding self. The questionnaires also include an overall section that asks about general parental concerns but is not used in the NLSCY, as these questions are similar to those already included in the survey. The NLSCY is using the ASQs for children aged 3 to 47 months, inclusive. The gross motor portion of the ASQs is not included, as this concept is covered in other portions of the survey.
Ages and Stages – Personal Score	As used in the NLSCY, the Ages and Stages component was generated for all children 3 to 47 months with an effective age of 3 years or less. The questions were grouped into the four categories listed in this table with each respondent receiving a score in the range of 0 to 60. For this measure, a high score indicates that the child is at or above the normal range for their age group.

Differences Amongst Children on Measures of Child Outcomes

It is relevant to ask if children in different population groups differ in child outcomes from those children outside each population group. If there were no differences amongst children on measures of child outcomes then, arguably, there is a weaker basis for developing child-related policies that are specific to each population group, and vice versa. Table 17 below explores this question.

For each of 16 child outcomes, Table 17 shows the mean value of each outcome for children in the stated age group who are in a particular population group and also the mean value for children outside the population group. If there is a statistically significant difference in these means, it is indicated by single (significance at 10%) or double (significance at 5%) stars.

Some caution is required in interpreting these differences in child outcomes. These are not initial or gross differences between children in different population groups. These are net differences after the effects of current policies and current investments by parents in their children (which may already have narrowed pre-existing differences between groups of children). The row at the bottom of each part of Table 17 shows the overall mean value of the child outcome and the standard deviation (a measure of dispersion) of these outcomes. A comparison between the size of the mean differences and the standard deviation allows us to gain a sense of the possible quantitative importance of these mean differences. We can summarize the results of Table 17 by looking at each population group in turn.

Immigrant children score significantly worse than other children on PPVT-R, a

measure of receptive vocabulary. The magnitude of the difference is over one-quarter of a standard deviation, which is reasonably substantial. There is no significant difference in number knowledge at the same age level, and, in fact, immigrant children have a statistically significant advantage in the Who Am I? scale (copying and writing tasks) at age 4-5. They also score better than non-immigrant children on scaled math scores in Grades 2 and 3.

Ages and Stages is a set of scales based on parent reports that measures development at ages 2-3. Ages and Stages includes measures of communication skills, problem solving, personal social skills and fine-motor skills. Immigrant children score better on the Problem Solving Scale, worse on communications and worse on fine motor skills.

The second panel of Table 17 comprises behavioural and emotional child outcomes for which higher scores often indicate more problematic behaviours. For immigrant children, the pattern here is mixed. On emotional disorder at ages 4-7 immigrant children score better than other children, and also better on hyperactivity and inattention at ages 4-7, and better on physical aggression at ages 4-7. However, on pro-social behaviour (ages 8-9) and on indirect aggression at ages 4-7, immigrant children score worse on average than other children.

We might summarize by saying that immigrant children show a mix of significantly positive and negative scores relative to other non-immigrant children. Of course, immigrant children are a heterogeneous group with country of origin potentially being an important factor that we do not measure.

Children in lone mother families score significantly worse than children from other families on some measures of cognitive, language and general development. These measures includes motor and social development at ages 2-3, problem solving and fine motor skills from Ages and Stages at ages 2-3, and scaled math scores in Grades 2 and 3.

However, results on behavioural, emotional and health measures are mixed. Children in lone mother families score worse than other children on emotional disorder at ages 4-7, on hyperactivity and inattention at ages 4-7, and on both the frequency of nose and throat infections and on the Health Utility Index. However, children in lone mother families score better on indirect aggression at ages 4-7 and on pro-social behaviour at ages 8-9.

As Table 17 shows, rural children differ in child outcomes significantly from other children in a number of ways. Rural children score worse on number knowledge at age 4-5, on Who Am I? at 4-5 and on scaled math scores at Grades 2 and 3. However, rural children score better than urban children on motor and social development at age 2-3, and on the personal score scale of Ages and Stages at age 2-3.

Official language minority children are, on average, similar to other children on

cognitive, language, numeric and general development measures. There are no significant differences on PPVT-R, number knowledge, Who Am I? (ages 4-5), Motor and Social Development (ages 2-3), or scaled Math scores in Grades 2 and 3. The same is true for the different components of Ages and Stages at 2-3, except for a significant advantage for official language minority children on the problem-solving component.

In general, official language minority children score better than (or the same as) other children on behavioural/emotional measures. In particular, OLM children score better on emotional disorder, physical aggression and indirect aggression at ages 4-7. However, these children have more frequent nose and throat infections than other children.

Table 17
Average Scores on Child Development Indicators by Population Groups and Overall Child Population, 2006-7

Variable Name	PPVT-R scores (ages 4-5)	Number Knowledge (ages 4-5)	Who Am I? (ages 4-5)	Scaled Math Scores (Grades 2 and 3)	Standardized Motor and Social Development C 7 standards (ages 2-3)
Immigrant Family	98.84**	99.51	24.73**	343.02**	99.76
Not Immigrant Family	102.92	99.22	23.44	333.26	101.13
Lone Mother Family	101.65	97.91	23.38	328.20**	96.40**
Not Lone Mother Family	102.04	99.41	23.76	336.55	101.23
Rural Family	102.16	96.69**	22.74**	328.05**	102.53*
Not Rural Family	101.99	99.57	23.84	336.51	100.62
Official Language Minority Family	100.88	98.94	23.38	334.70	100.45
Not Official Language Minority Family	102.08	99.30	23.75	335.68	100.86
Overall Average (and Standard Deviation)	102.01 (14.33)	99.28 (14.30)	23.73 (6.82)	335.62 (57.26)	100.83 (14.14)

Notes: * Mean difference between those inside and outside population group is statistically significant at .10
** Mean difference between those inside and outside population group is statistically significant at .05

Table 17 (continued)
Average Scores on Child Development Indicators by Population Groups and Overall Child Population, 2006-7

Variable Name	Emotional Disorder (ages 4-7)	Pro-social behaviour (ages 8-9)	Hyperactivity and Inattention (ages 4-7)	Physical Aggression (ages 4-7)	Indirect Aggression (ages 4-7)	Frequency, Nose/Throat Infections (ages 2-3)	Health Utility Index (ages 4-5)
Immigrant Family	2.16**	14.18**	3.88**	1.33**	0.68**	4.02	0.972
Not Immigrant Family	2.41	14.67	4.27	1.52	0.56	4.05	0.971
Lone Mother Family	2.58**	15.06**	4.86**	1.53	0.43**	4.26**	0.960**
Not Lone Mother Family	2.32	14.49	4.10	1.46	0.60	4.02	0.972
Rural Family	2.14**	14.45	4.21	1.64*	0.50	4.21**	0.972
Not Rural Family	2.37	14.57	4.16	1.45	0.60	4.02	0.971
Official Language Minority Family	1.98**	14.54	4.05	1.14**	0.44*	4.23**	0.968
Not Official Language Minority Family	2.37	14.55	4.18	1.49	0.59	4.03	0.971
Overall Average (and Standard Deviation)	2.34 (2.08)	14.55 (3.75)	4.17 (2.81)	1.47 (1.87)	0.59 (1.13)	4.04 (0.91)	0.971 (0.07)

Notes: * Mean difference between those inside and outside population group is statistically significant at .10
** Mean difference between those inside and outside population group is statistically significant at .05

Table 17 (continued)
Average Scores on Child Development Indicators by Population Groups and Overall Child Population, 2006-7

Variable Name	Ages and Stages – Problem Solving (ages 2-3)	Ages and Stages – Personal Score (ages 2-3)	Ages and Stages – Communication Score (ages 2-3)	Ages and Stages – Fine Motor Score (ages 2-3)
Immigrant Family	54.85**	53.60	52.91**	45.96**
Not Immigrant Family	53.19	53.75	54.40	47.64
Lone Mother Family	52.05*	53.85	53.53	43.59**
Not Lone Mother Family	53.69	53.70	54.12	47.60
Rural Family	53.81	54.80*	54.72	47.93
Not Rural Family	53.53	53.58	53.99	47.18
Official Language Minority Family	55.37**	54.39	54.25	48.04
Not Official Language Minority Family	53.42	53.66	54.06	47.20
Overall Average (and Standard Deviation)	53.56 (9.25)	53.72 (7.83)	54.07 (9.01)	47.26 (12.78)

Notes: * Mean difference between those inside and outside population group is statistically significant at .10
** Mean difference between those inside and outside population group is statistically significant at .05

Modelling the Effects of Child Care on Child Development

The NLSCY is, generally speaking, a good data set for looking at issues of child development. It includes a large number of child outcome variables measured at different ages and it includes detailed measures of child care use and a range of demographic variables for mothers and children. Child development is a very complex process, affected by a wide range of factors and experiences over the child's life and there are different possible approaches to modelling this process and estimating the effects of different factors. We have discussed some of these methodological approaches in the literature review above.

For the purposes of this paper, we have adapted an approach used in previous work by two economists – Pierre Lefebvre and Philip Merrigan from the Universite du Quebec a Montreal. Lefebvre and Merrigan wrote an article in Canadian Public Policy in 2002 called "The Effect of Childcare and Early Education Arrangements on Developmental Outcomes of Young Children"using data from Cycle 1 of the NLSCY. Their focus was on cognitive outcomes and motor and social development (PPVT-R and MSD scores). Lefebvre and Merrigan ran OLS regressions of child outcomes against variables that summarize child care use patterns of the child and a host of other variables designed to control for family background and factors correlated with the choice of a particular type of care. They use the following regressors:

Type of child care
Hours of child care per week
Number of child care arrangements used per week
Attendance at kindergarten, junior kindergarten or other education activity program
Mother's labour force activity
Mother's age at child's birth
Mother's education
Mother is lone mother
Immigrant status of mother (0-4 years, 5-9 years, 10 or more years)
Blended family or step-parent dummy (at least one parent is a non-biological parent)
Child's age
Child gender
Child birth weight
Number of siblings in the family
Province or region
Family income

Our objective in this paper is to determine the associations between three sets of variables: membership in one of the four population groups of interest, patterns of child care used by the child, and the sixteen child development outcomes described in Table 16. In determining these associations, we want to control for a wide range of child, mother and family variables that may independently affect child outcomes (and may be correlated with the decisions about child care use

patterns). Controlling for this large number of child, mother and family characteristics (very similar to the list of variables used by Lefebvre and Merrigan and identical to the variables used in the child care use regressions in Chapter 2) reduces the possibility of bias due to selectivity effects as discussed in the literature review.

The dependent variables in the regressions described in Tables 18, 19 and 20 are the level of child development measured by each variable in Cycle 7 (2006-7) and sometimes Cycle 6 and 7; all of them are continuous, rather than categorical, outcome measures. The main child care variables used as regressors include the type of child care used, the hours of all types of non-parental child care used per week, and the number of different types of child care used per week (based on the six types of child care recorded in the NLSCY rather than the compressed grouping of four types used in most places in this paper).

Viewing child care use as an investment in the child's development suggests that we should measure the child care investment in an earlier period than the period in which child outcomes are measured, and so we do this (Lefebvre and Merrigan were not able to, because they were using only data from Cycle 1 of NLSCY). Measures of child care use (and, indeed, all other explanatory variables) are taken from the cycle prior to the cycle in which the child outcomes were recorded Generally this means that the child care use and other explanatory variables are taken from Cycle 6 and the child outcomes are measured in Cycle 7. For some of the outcomes, all explanatory variables are taken from Cycle 5 and the child outcomes are recorded in Cycle 6 and Cycle 7 (a four-year age span).

In addition to child, mother and family characteristics and child care use patterns, our regressions include two other key groups of explanatory variables. First, we include dummies for being a member of each of our four population groups of interest. These will tell use what the independent effect on developmental level is of being a member of the population group, holding constant child, mother and family characteristics and also holding constant the chosen pattern of child care use. The second key group of variables includes interaction terms between, for instance, type of child care and membership in a population group. These interaction terms will tell us whether the associations between child care use and child development are the same or different for children inside and outside these four population groups.

Results of Child Development Regressions

Tables 18, 19 and 20 present the results of the 16 child development regressions, each on the same set of regressors described above. Because the list of variables in each regression is long, the tables only record the results for the variables of particular interest to this study – the child care variables, the interacted child care variables and the population group variables[9].

[9] Full results are available from the authors on request.

Sometimes higher values of the sixteen child development indicators are desirable (e.g., PPVT-R scores, motor and social development scores) and, sometimes, lower values of these indicators are desirable (e.g., physical aggression, hyperactivity and inattention). This creates awkwardness in describing the results; we will often use the terminology of "desirable" and "undesirable" results in what follows to avoid possible confusion.

Caveats

The results in Tables 18, 19 and 20 may or may not be causal results. Using a wide range of controls for child, mother and family characteristics increases the plausibility of a causal interpretation, particularly since many of those characteristics are likely to control for the selectivity of child care use patterns. However, further research would need to confirm these results to increase our confidence in a causal interpretation. Some of the results may be better interpreted as associations (e.g., it may be more appropriate to conclude that children with lower PPVT-R scores are more likely to consistently use care by an unregulated non-relative, rather than concluding that consistent care by an unregulated non-relative causes lower scores on this measure of received vocabulary).

It is worth noting that our model may or may not have good controls for prior child ability. The child outcomes in our regressions all measure the current (Cycle 7) level of ability or inability of the child. If the child, mother and family variables that we use in the regressions provide proxies for the previous ability of the child, then our regressions will estimate the effects of child care variables on the change in ability from before to current levels (a plausibly causal set of estimates). However, if the proxies for previous ability are inadequate, our regressions will be estimating the associations between child care use and the current level of ability of the child, and this is less likely to be an estimate that is plausibly causal. It is difficult to directly control for prior child ability using the NLSCY because most of the child outcome measures are not strictly comparable across different ages of the same child.

The other major caveat for our regression results concerns the issue of child care quality. As the literature review suggests, the quality of child care has generally been found to be the major characteristic that determines the child development effects of non-parental child care on the child. There are no objective measures of the quality of the primary type of child care used by each child in the NLSCY, and it is not clear to what degree the existing parent-reported measures are correlated with objective quality. Hence, we may be missing a key factor in our empirical analyses in Tables 18, 19 and 20. Further, if different levels of quality are associated with other included variables (e.g., income, immigrant background, rural location), our regressions may falsely attribute to one of the included variables an effect that is truly due to child care quality.

The Main Effects of Child Care on Children

REGULATED CHILD CARE

Regulated child care has a pattern of desirable effects on children's development across the sixteen child outcomes recorded in Tables 18, 19 and 20. Looking only at statistically significant results, the main effect (i.e., ignoring interaction effects) of using regulated care rather than the reference category of exclusively parental care is positive for number knowledge, for the copying and writing tasks scored in Who Am I?, for Motor and Social Development at age 2-3, for problem-solving (Ages and Stages) at age 2-3, and for personal skills (Ages and Stages) at age 2-3. Regulated child care also has desirable effects on two measures of behaviour (and no undesirable effects): pro-social behaviour measured at age 8-9, and indirect aggression at ages 4 through 7.

UNREGULATED CARE BY A NON-RELATIVE

Using unregulated care by a non-relative rather than exclusively parental care has some of the same main effects on children as does regulated child care, with important exceptions. In particular, the use of unregulated non-relative care has a statistically significant negative effect on the PPVT-R scores of preschool children with employed or studying mothers. Further, unregulated care by a non-relative does not have any positive effect on motor and social development at age 2-3 or on problem-solving skills as measured by Ages and Stages at age 2-3. However, using unregulated care by a non-relative is positive for number knowledge, for the copying and writing tasks scored in Who Am I?, and for personal skills (Ages and Stages) at age 2-3. Unregulated non-relative child care also has desirable effects on two measures of behaviour (and no undesirable effects): pro-social behaviour measured at age 8-9, and indirect aggression at ages 4 through 7.

UNREGULATED CARE BY A RELATIVE OF THE CHILD

Using unregulated care by a relative rather than exclusively parental care has a positive effect on personal skills as measured by Ages and Stages at age 2-3, but otherwise has no significant positive or negative effects on cognitive, language, pre-math and math, or general development measures. There are, however, desirable effects on two measures of behaviour (and no undesirable effects): pro-social behaviour measured at age 8-9, and indirect aggression at ages 4 through 7.

OTHER MAIN CHILD CARE EFFECTS

Regression results described in Tables 18, 19 and 20 include the main effect of hours of child care (total hours per week in all types of non-parental child care) and the main effect of the number of individual types of non-parental child care arrangements used over the course of a week (not including kindergarten, but including all six types of non-parental care identified by the NLSCY). Longer hours of child care in a week has undesirable effects on number knowledge at age 4-5, but desirable effects on fine motor skills as measured by Ages and Stages at age 2-3, and on emotional disorder from ages 4-7. The number of individual types of child care used in a week has undesirable effects on math

scores in Grades 2 and 3, on emotional disorder at ages 4-7 and on indirect aggression at ages 4-7, but no significant effects on other child outcomes.

Separate Effects For Each Population Group

Using child care of different types, hours and number of types of care does not necessarily have the same effect on all children. In the regressions described in Tables 18, 19 and 20, there are a wide range of interactions that estimate how the effects of child care on our four population groups may differ from the main effects described above (the overall effect would be the sum of the different effects – both main effects and interaction effects and for type of care, hours of care and multiple use of types of care). For instance, use of regulated, unregulated non-relative or unregulated relative care by immigrant children is associated with less desirable scores on the copying and writing tasks of Who Am I? The coefficient for use of regulated child care is -16.123.

It is quite tricky to interpret coefficients such as this accurately. On the face of it, the appropriate interpretation would seem to be that immigrant children who use regulated child care will therefore do much worse on copying and writing tasks at ages 4-5 than they would have done had they used another form of child care. Let's imagine that the comparison of interest is between the use of exclusively parental care and regulated child care. From the regression results presented in Table 18, we can find that the effect of using regulated child care rather than parental care is composed of several measured effects. First, there is the "main" effect of using regulated child care (+5.838). Then, there is the specific effect of using regulated care on immigrant children (-16.123). However, we are comparing the effects of using a form of non-parental child care to exclusively parental care, so we should also include the main effect of hours of non-parental care (-.050) and the specific effect of hours on immigrant children (+.252). If regulated care were typically used for about 40 hours per week, the net effect of hours would be +8.08. The regressions also include the effect of the use of multiple types of non-parental child care. We are assuming the use of one type of non-parental care (regulated), so the main effect of this would be +1.038 and the specific effect on immigrant children would be -2.693, for a net effect of -1.655. Adding all of these effects together, we find that the net effect on immigrant children of using regulated care rather than exclusively parental care would be -4.698 (about one-quarter of a standard deviation on the Who Am I? scale).

Even that would be misleading if we were anticipating that immigrant children using regulated child care would be found to do worse than non-immigrant children. For Who Am I?, the effect of being an immigrant child (no matter what type of care is chosen) is +10.988, large enough to completely offset the negative effects of using regulated care.

An alternative comparison of interest would be the effects of regulated care vs. the effects of unregulated care by a relative for immigrant children. Again, let us

look at Who Am I? The apparent interpretation of the results of the regression in Table 18 suggests that the effects of regulated care on immigrant children (-16.123) would be more negative than the effects of care by a relative (-11.289). However, this ignores the main effects of regulated care (+5.858) and care by a relative (-.406) care. In our regressions, hours and types of care are presumed to have the same effect, no matter what type of non-parental care is used, so we do not need to take account of hours of care for this comparison. The net effect of using regulated care is, therefore, less negative (for copying and writing tasks measured in Who Am I?) than care by a relative (-10.265 vs. -11.695). As these examples suggest, to fully determine the overall effect of different types of care on different types of children requires that the investigator do a series of simulations of different scenarios of interest. The sections below will describe regression effects on each population group.

CHILDREN FROM IMMIGRANT FAMILIES

For most of the cognitive, vocabulary and general development measures analyzed in Table 18, immigrant children using different types of non-parental child care do not score significantly differently than other children. Therefore, the main effects of the use of these different types of care would be valid for immigrant children. The main exception to this is with the Who Am I? scale (copying and writing tasks at age 4-5). For this scale, use of either regulated or unregulated types of care rather than parental care appears to affect these scores negatively (see above). In addition, the use of unregulated care by a non-relative is associated with lower scores on number knowledge at age 4-5.

Use of regulated care or care by a relative is associated with less desirable scores on indirect aggression at ages 4-7 and on fine motor scores as measured by Ages and Stages at age 2-3. However, increased hours of non-parental care have desirable effects on immigrant children. Increased hours are associated with better results on PPVT-R, on Who Am I?, on indirect aggression at ages 4-7, on communications skills and fine motor skills as measured by Ages and Stages at age 2-3. The multiple use of types of care in one week is associated with negative effects on PPVT-R for immigrant children and undesirable effects on the Health Utility Index. Otherwise, the main effects of child care described above apply to immigrant children, and, as described above, the total effect on any child is the sum of main effects and population-group-specific effects.

Table 18
Variables Associated with Indicators of the Level of Language, Cognitive, Pre-Math and Mathematics Development of Children Using Child Care, with Mother Employed or Studying in Canada, NLSCY Cycle 7 (2006-7) - OLS Regression Results

Variable Name	PPVT-R scores (ages 4-5; Cycle 6 to Cycle 7)	Number Knowledge (Ages 4-5; Cycle 6 to Cycle 7)	Who Am I? Scale (ages 4-5; Cycle 6 to Cycle 7)	Scaled Math Scores (Grades 2 and 3; Cycle 5 to Cycle 7)	Standardized Motor and Social Development – C7 standards (ages 2-3; Cycle 6 to Cycle 7)
Constant Term	89.646**	44.599**	36.626**	283.259	78.798**
Child Care Variables					
Primary Care = Regulated	-2.455	3.815**	5.858**	3.551	3.864*
Primary Care = Unregulated Non-relative	-2.935*	4.005**	4.115**	1.662	3.471
Primary Care = Unregulated Relative	-2.950	.030	-.406	1.153	3.158
Care = Exclusively Parental	Reference category	Reference Category	Reference Category	Reference Category	Reference category
Number of hours per week in all types of care (kind. excluded)	-.006	-.078**	-.050	-.120	-.024
Number of individual types of non-parental child care arrangements	.268	.675	1.038	-6.691**	-.535
Interacted Child Care Variables					
Immigrant * regulated	4.089	-5.341	-16.123**	.111	-3.942
Immigrant * non-relative	-1.795	-10.907**	-14.651**	-9.917	-1.224

Immigrant * relative	.601	-6.048	-11.289**	-1.337	-3.620
Immigrant * hours of care	.131**	.067	.252**	-.074	.016
Immigrant * # of types/wk	-4.133**	.327	-2.693	7.674	1.699
Lone mother * regulated	-1.824	-26.462**	-25.857**	-18.426	7.030
Lone mother * non-relative	-1.591	-28.500**	-24.830**	-24.074*	10.732
Lone mother * relative	-3.068	-24.600**	-20.820**	-20.886	-4.343
Lone mother * hours of care	.069	.355**	.115	.123	-.270**
Lone mother * # of types/wk	4.551*	3.892	8.340**	9.968*	4.491
Rural * regulated	.242	3.594	.201	-13.210	-3.966
Rural * non-relative	1.422	2.204	-.222	-1.020	.643
Rural * relative	3.546	4.608	5.470	-8.151	2.516
Rural * hours of care	-.036	.034	-.087	.184	.156
Rural * # of types/wk	-2.527	-3.931*	-5.789**	3.009	.135
OLM * regulated	14.868**	.641	10.466	-9.880	-5.171
OLM * non-relative	10.404*	.496	18.149**	-18.795	-14.233*
OLM * relative	19.547**	1.212	3.698	-1.890	-14.243*
OLM * hours of care	-.215*	-.122	-.026	-.151	.142
OLM * # of types/wk	1.658	1.742	-.654	20.621**	3.175
Population Group Variables					
LONE MOTHER FAMILY	-7.965*	1.272	9.431*	-7.846	-2.290
FAMILY LIVES IN RURAL AREA	2.866	-.132	5.122**	-1.194	-1.393
IMMIGRANT FAMILY	-5-509**	3.062**	10.988**	5.588	-.631
OFFICIAL LANGUAGE MINORITY FAMILY	-9.781**	.238	-9.413**	-11.611*	-.501
Diagnostic Statistics					
Adjusted-R-squared	.119	.135	.184	.315	.118
Mean of Dependent Variable	102.01	99.28	99.83	355.62	100.83
Standard Deviation of Dependent Variable	14.325	14.299	16.242	57.264	14.135
Number of observations (n)	1775	1786	1763	2748	1546

Table 19
Variables Associated with Indicators of the Level of Social, Emotional, Behavioural and Health Development of Children Using Child Care, with Mother Employed or Studying in Canada, Cycle 7 (2006-7) - OLS Regression Results

Variable Name	Emotional Disorder (ages 4-7; Cycle 6 to Cycle 7)	Pro-social Behaviour (ages 8-9; Cycle 5 to Cycle 7)	Hyperactivity and Inattention (ages 4-7; Cycle 6 to Cycle 7)	Physical Aggression (ages 4-7; Cycle 6 to Cycle 7)	Indirect Aggression (ages 4-7; Cycle 6 to Cycle 7)	Frequency of Nose and Throat Infections (ages 2-3; Cycle 6 to Cycle 7)	Health Utility Index (ages 4-5; Cycle 6 to Cycle 7)
Constant Term	1.445**	12.650**	8.525**	2.178**	-.046	4.316**	.922**
Child Care Variables							
Primary Care = Regulated	-.007	.929**	.271	-.003	-.235**	-.121	.003
Primary Care = Unregulated Non-relative	-.024	.735**	.089	.126	-.224**	-.090	-.003
Primary Care = Unregulated Relative	-.255	1.339**	.001	.063	-.192*	.185	-.008
Exclusively Parental Care	Reference category	Reference category	Reference Category	Reference Category	Reference Category	Reference Category	Reference Category
Number of hours per week in all types of care (kind. excluded)	-.006*	-.006	-.002	.001	.000	.003	.000
Number of individual types of non-parental child care arrangements	.210**	-.093	.071	.096	.151**	-.072	.007*
Interacted Child Care Variables							
Immigrant * regulated	.031	-.587	-.249	.258	.496**	.038	-.016
Immigrant * non-relative	-.200	-.564	-.650	.238	.102	.029	.008
Immigrant * relative	.311	-.228	-.052	-.302	.493**	-.502**	.010
Immigrant * hours of care	.001	-.006	-.003	-.005	-.009**	.003	.001**

Immigrant * # of types/wk	-.116	-.103	.125	.025	.027	.108	-.024**
Lone mother * regulated	.062	-1.121	-.193	-.214	.734**	-.400	-.050*
Lone mother * non-relative	-.484	-.462	-.319	-.492	.375	-.236	-.036
Lone mother * relative	-.246	-.449	.692	.243	.873**	-.243	-.024
Lone mother * hours of care	.003	.026*	.026**	-.015*	-.009	.004	.000
Lone mother * # of types/wk	-.253	-.779**	-.264	-.143	-.211*	.148	.003
Rural * regulated	-.118	1.458*	-.192	.466	.447*	.298	-.018
Rural * non-relative	.108	1.396	.462	.227	.327	.432	-.021
Rural * relative	.490	-.221	.534	.289	.448	-.032	-.005
Rural * hours of care	.012	-.018	-.007	.006	-.002	-.007	.001*
Rural * # of types/wk	.157	.274	.547*	-.164	-.218*	-.015	-.013
OLM * regulated	.287	.119	-1.002	-.271	.245	.073	-.002
OLM * non-relative	.984	.206	-.732	.085	.364	-.825*	.020
OLM * relative	.489	-.104	-1.004	-.265	-.006	-.332	-.021
OLM * hours of care	.000	-.002	.024	-.009	.007	.005	.000
OLM * # of types/wk	.121	-.610	.068	.446	-.111	-.087	.006
Population Group Variables							
LONE MOTHER FAMILY	.479	.795	-.183	.183	-.453**	.420	.020
FAMILY LIVES IN RURAL AREA	-.647**	-.828**	-.398	-.138	-.142	.216*	.009
IMMIGRANT FAMILY	-.239*	.075	-.231	-.220*	-.113	-.087	.012
OFFICIAL LANGUAGE MINORITY FAMILY	-.710**	.663	.003	-.423*	-.348**	.411**	-.002
Diagnostic Statistics							
Adjusted-R-squared	.118	.087	.114	.104	.081	.139	.043
Mean of Dependent Variable	2.34	14.55	4.17	1.47	.59	4.04	.9711
Standard Deviation of Dependent Variable	2.083	3.753	2.807	1.873	1.133	.910	.0695
Number of observations (n)	3738	3691	3724	3720	3550	1556	1988

Table 20
Variables Associated with the Ages and Stages Indicators of the Level of Development of Children Using Child Care, with Mother Employed or Studying in Canada, NLSCY Cycle 7 (2006-7) - OLS Regression Results

Variable Name	Ages and Stages – Problem Solving (Analytical Reasoning); 2-3 years; Cycle 6 to Cycle 7	Ages and Stages – Personal Score (Personal/Social Skills); 2-3 years; Cycle 6 to Cycle 7	Ages and Stages – Communication Score (Communication Skills); 2-3 years; Cycle 6 to Cycle 7	Ages and Stages – Fine Motor Score; 2-3 years; Cycle 6 to Cycle 7
Constant Term	41.187**	46.947**	50.960**	31.557**
Child Care Variables				
Primary Care = Regulated	2.648*	3.483**	2.158	2.970
Primary Care = Unregulated Non-relative	1.156	2.561**	1.446	.497
Primary Care = Unregulated Relative	2.219	2.870**	2.048	2.942
Care = Exclusively Parental	Reference category	Reference Category	Reference Category	Reference Category
Number of hours per week in all types of care (kind. excluded)	.028	-.001	-.006	4.081**
Number of individual types of non-parental child care arrangements	-.437	-.576	-.423	.821
Interacted Child Care Variables				
Immigrant * regulated	-1.975	2.846	.860	-9.351**
Immigrant * non-relative	3.841	1.828	1.665	-6.451
Immigrant * relative	1.982	1.875	.145	-7.453**
Immigrant * hours of care	.009	-.013	.077*	.199**
Immigrant * # of types/wk	-2.123	-.826	-.448	-1.188
Lone mother * regulated	-2.227	-9.135**	-4.628	-1.397

Lone mother * non-relative	-1.069	-4.123	-2.460	2.513
Lone mother * relative	1.450	-3.870	-4.219	-8.048
Lone mother * hours of care	-.072	.039	.006	-.115
Lone mother * # of types/wk	3.098	.271	-.925	3.507
Rural * regulated	-7.606**	-2.085	-.685	1.481
Rural * non-relative	-5.219	-2.070	3.419	.265
Rural * relative	-5.094	-3.387	2.040	2.298
Rural * hours of care	.084	-.029	.038	.073
Rural * # of types/wk	2.251	2.216	-.081	-1.367
OLM * regulated	-.987	.006	-3.052	.708
OLM * non-relative	-5.352	-1.297	-9.022*	-3.820
OLM * relative	.017	.072	-5.645	-10.249*
OLM * hours of care	-.012	.023	.088	-.017
OLM * # of types/wk	-.360	-1.221	2.581	.891
Population Group Variables				
LONE MOTHER FAMILY	3.11	8.554**	1.506	3.273
FAMILY LIVES IN RURAL AREA	1.14	1.190	-.896	-.306
IMMIGRANT FAMILY	2.68**	-.874	-3.110**	.070
OFFICIAL LANGUAGE MINORITY FAMILY	3.00*	1.044	-.761	2.502
Diagnostic Statistics				
Adjusted-R-squared	.084	.101	.042	.078
Mean of Dependent Variable	53.56	53.72	54.07	47.26
Standard Deviation of Dependent Variable	9.251	7.827	9.006	12.779
Number of observations (n)	1502	1551	1550	1493

CHILDREN IN LONE MOTHER FAMILIES

Use of any type of care other than parental care by children of lone mothers is associated with substantially worse results on number knowledge and Who Am I? at age 4-5, and use of unregulated care by a non-relative is associated with worse results on math scores in Grades 2 and 3. In addition, use of regulated care by children of lone mothers at ages 0-1 and 2-3 has negative effects on the score of personal skills measured by Ages and Stages at age 2-3. Further, use of regulated care will have undesirable effects on indirect aggression at ages 4-7 and on the Health Utility Index. Use of care by a relative will have undesirable effects on indirect aggression.

The use of longer hours of care by children from lone mother families is associated with a mix of desirable and undesirable effects. There are positive effects on number knowledge at age 4-5, negative effects on motor and social development at age 2-3, desirable effects on pro-social behaviour at age 8-9 and physical aggression at age 4-7, but undesirable effects on hyperactivity and inattention at age 4-7. The use of multiple types of care in a week has, perhaps surprisingly, a number of positive effects on the children of lone mothers. There are desirable effects on PPVT-R, on Who Am I?, on Scaled Math Scores, and on indirect aggression. However, it is also associated with decreased scores on pro-social behaviour.

CHILDREN IN RURAL FAMILIES

For unregulated non-relative care and for unregulated care by a relative, there are no significant differences in their effects on rural children in comparison to urban children. However, regulated care is associated with worse scores on problem-solving for rural children at age 2-3, with better scores on pro-social behaviour at age 8-9, and with worse results on indirect aggression at age 4-7. Hours of care generally has the same effect on rural children as it does on urban children (with the exception of a small positive effect on the Health Utility Index). Number of types of care used in a week has a differential negative effect on rural children for number knowledge and Who Am I? measured at age 4-5, an undesirable effect on hyperactivity and inattention at age 4-7, but a desirable effect on indirect aggression at the same ages.

CHILDREN IN OFFICIAL LANGUAGE MINORITY FAMILIES

There are also some differences in the effects of different types of care on children from official language minority families. Regulated care is associated with a strong positive effect on PPVT-R scores, but no differentiation on other child outcomes. Unregulated care by a non-relative has a strong positive effect on Who Am I? scores at age 4-5, but a strong negative effect on motor and social development at age 2-3, and on communication skills at age 2-3. There is a desirable effect on the frequency of nose and throat infections.

Apart from a significant negative effect on PPVT-R, hours of care does not have a differential effect for official language minority children. An increase in the number of types of child care used in a week is associated with a large positive

effect on scaled math scores at Grades 2-3, but otherwise with no differential effects on official language minority children.

ARE THESE POPULATION-GROUP EFFECTS CAUSAL?

By including a large number of child, mother and family variables, the child outcome regressions in Tables 18, 19 and 20 attempt to control for confounding influences, so that the separate effects of child care on child development can be estimated. In particular, these child, mother and family variables are intended to control for selection effects and initial levels of child ability. The presumption that the effects shown in Tables 18 through 20 are causal is based on the view that these regressions have controlled adequately for both selection and child ability effects.

However, there are other reasonable interpretations of the coefficients estimated in these tables (and described above). For instance, a negative effect of the use of regulated care by rural children on the Problem Solving Scale of Ages and Stages at age 2-3 (Table 20) might be partially due to the lower average quality of regulated care in rural areas (Beach, 1995). This would imply that it is not regulated care that has negative effects, but only low-quality regulated care. Since the NLSCY does not include objective measures of the quality of different types of care, it is not possible to separately control for variations in the quality of care.

Alternatively, in the administration of regulated care in rural areas in Canada, there might be a selection mechanism that allocates children to regulated care who are doing more poorly on problem-solving tasks at age 2-3. It might be true that these children using regulated care in rural areas benefit considerably from the more structured and rich environment and therefore make good progress relative to peers in other types of care (but do not fully catch up). If our regressions have not controlled well for the initial level of ability in problem-solving tasks and do not have controls for this selection mechanism in rural areas, then this could result in the negative coefficient described above.

As a result, it is appropriate to be modest about the findings on the links between child care and child development in this paper. The regressions in Tables 18, 19 and 20 indicate associations among types, hours and multiple use of child care and various measures of child development of children from immigrant, lone mother, rural and official language minority families. These measured effects may be causal or may be due to a combination of selection effects and inadequate controls for child ability and the quality of child care used. Because of the dramatic recent changes in the types of child care found in the first part of this paper, it is important to be able to determine the causal effects on child development of the different child care decisions that families make. However, this paper is at the beginning of a research agenda rather than the end.

5. Summary and Conclusions

Summary of Main Findings in This Study

The population groups studied in this paper comprise significant proportions of the overall Canadian population with preschool children and employed or studying mothers. Immigrant families make up over one-quarter, lone mother families are nearly 12%, rural families about 11% and official language minority families are 6.4%. Most studies of child care use and child development do not focus on the differential choices and experiences of these population groups.

Population Groups and Child Care Type, Hours and Expenditure

The primary type of child care used by all Canadian families for their preschool children is regulated child care, mostly provided in child care centres, preschools or nursery schools, but also by licensed providers in a family home. Perhaps surprisingly, regulated care is also the main type of child care used by each of the four population groups of interest. For Canadian families as a whole, the second most frequently used type of child care is parental care; this is also the second most frequent choice of immigrant, rural, and official language minority families. Unregulated care by a non-relative and care by a relative of the child are less frequently used.

However, within this context of similarity of choices, there are statistically significant differences in the pattern of types of child care used by each of the population groups when compared to those families not in the population group. Immigrant and rural families are somewhat less likely to use regulated care and more likely to use parental care or care by a relative. Lone mother families are quite likely to use regulated care with care by a relative being a distant second in frequency. Official language minority families are somewhat more likely to use regulated care and less likely to use exclusively parental care.

Different families use different amounts of non-parental child care. Of those families using non-parental child care, more use 40 hours or more per week than any other category. Generally, that is also true of immigrant families, lone mother families and official language minority families. However, for rural families who use non-parental care, child care for less than 20 hours per week is the largest category.

Considering the three types of non-parental child care defined in this study, fewer than 6 percent of all children use more than one type in a regular week. Rural families are the most likely to use multiple types of non-parental care, and immigrant families are the least likely.

Child care can be expensive either in terms of time or money. About 30% of all families with preschool children and an employed or studying mother use exclusively parental care, a significant time burden on working parents. Some of these children are cared for by a mother or father on maternity or parental leave.

Some are cared for by a mother at her workplace (generally self-employment located at her own home). Others are cared for by off-shifting between father and mother, usually with the mother working on a part-time basis.

Families who purchase non-parental care frequently face a substantial cost burden. Even when low-fee Quebec child care and subsidized care for low-income families are included in the total, and when part-time use of child care is included, the average amount of weekly spending per preschool child is about $100. Immigrant families are especially likely to spend over $100 per week, while lone mother families and especially rural families are likely to spend smaller amounts. The pattern of weekly expenditures for official language minority families is similar to the overall average proportions for the population as a whole.

Between 10% and 17% of families in our four population groups who currently use some type of non-parental child care would prefer to be using some other type. Lone mother families and official language minority families are at the top of that range and rural families at the lower end. The chief reasons why preferred types of child care are not currently used include high costs, long waiting lists, and lack of availability.

The changes in the pattern of use of types of child care over a 12-year period, from 1994-95 to 2006-07 are dramatic. These changes have been shared across all four population groups in this study. The use of regulated child care has leapt from less than 20% to more than 40% of all preschool children in Canada with employed or studying mothers. The use of regulated care by children of immigrant families has very nearly doubled over this period, and the proportions of rural families and official language minority families using regulated care has more than doubled. The rate of increase is smaller for lone mother families, largely because these families were substantial users of regulated care even in 1994-95. For each of the population groups, use of exclusive care by parents and use of unregulated care by a non-relative has fallen, while care provided by a relative has risen moderately across all population groups. Although, Quebec has led the rise in the use of regulated care, the same patterns described above are unmistakable even when the rest of Canada is considered separately.

The changes over the same 12-year period in the pattern of hours of child care used are much more modest than the change in types of care. For each of the population groups of interest there has been a modest increase in child care 40 hours or more per week, and a modest drop in the decision to use zero hours of non-parental care.

Data on weekly child care expenditures have been collected by the NLSCY in Cycle 7 for the first time. However, there are related data from the Survey of Household Spending for Canadian families with an employed mother and who purchase child care. These data show that annual average child care expenditures in the rest of Canada outside Quebec has risen by nearly 45% over

the eight-year period from 1997 to 2005 even after controlling for inflation. Available data does not permit a breakdown of this change by population group.

An analysis of the determinants of child care use patterns finds that child care decisions of immigrant, lone mother, rural and official language minority families are different than that of other families. Immigrant families are more likely to use care by a relative and less likely to use unregulated care by a non-relative. Lone mother families are especially likely to use any alternative to parental care. Rural families tend towards non-relative care or care by a relative. Official language minority families tend towards non-relative care. These effects are the effects of being in a population group, after controlling for a large number of child, mother and family characteristics. These population group effects may be due to differences in child care preferences, but they could also be due to differences in price or availability of different child care alternatives.

Clearly, however, factors that affect the child care choices of other families are also important for families in our four population groups. Mother's employment situation (hours of work, shift and self-employment status) is especially important. Characteristics of the children (age, number of children and birth order) are significant, and so are various family characteristics (mother's and father's incomes, mother's education, aspects of family functioning, and province or region of residence. A model with all of these factors included as well as membership in the four population groups fits the data quite well.

Population group membership has some effects on the hours of care, separate from the effects of child, mother and family factors. Being a lone mother substantially increases the odds of using more hours of child care, with the strongest effect at 40 hours and more. Being an immigrant family significantly increases the odds of using 40 hours or more of child care per week. Living in a rural area increases the probability of using a small amount of non-parental care rather than using exclusively parental care. Controlling for other factors, there are no significant effects of being in an official language minority family on the hours of child care used.

All else constant, immigrant families are more likely than other families to have zero expenditures rather than positive expenditures on child care. Official language minority families are more likely, all other factors being controlled, to have positive amounts of child care spending each week. For those families that do have positive expenditures, being in an immigrant family increases the amount spent per week, while being in a rural family decreases the amount spent per week.

Population Groups, Child Care and Child Development

Measuring across sixteen measures of child outcomes, and independent of the child care arrangements chosen, we can say that children in our four population groups are not the same as children outside those population groups.

Immigrant children score significantly worse than other children on a measure of

receptive vocabulary at age 4-5 and on a communications scale at age 2-3, but score significantly better than other children on some measures of math-related and writing-related measures at a range of ages.

On emotional/behavioural scales at ages ranging from 4 to 9, immigrant children are significantly better than non-immigrant children on some (emotional disorder, hyperactivity and inattention, and physical aggression) and significantly worse on others (pro-social behaviour and indirect aggression). It may be that child outcomes vary for immigrant children by country of origin.

Children in lone mother families score significantly worse than children from other families on some measures of cognitive, language and general development. However, results on behavioural, emotional and health measures are mixed. Children in lone mother families score worse than other children on emotional disorder, hyperactivity and inattention, and on both the frequency of nose and throat infections and on the Health Utility Index. However, children in lone mother families score better on indirect aggression and on pro-social behaviour.

Rural children score worse on number knowledge, on writing and copying skills and on math scores at Grades 2 and 3. However, rural children score better than urban children on motor and social development and personal skills at young ages.

Official language minority children are, on average, similar to other children on cognitive, language, numeric and general development measures. In general, official language minority children score better than (or the same as) other children on behavioural/emotional measures. In particular, OLM children score better on emotional disorder, physical aggression and indirect aggression.

Using Ordinary Least Squares, we use regression techniques to find the associations between a large number of child, mother and family characteristics and a large number of measures of child development. Holding these characteristics constant (which may control for selection effects), we examine the relationship between child care use and child development. Even though we have no evidence about variations in quality, we find that regulated child care has a pattern of desirable effects on children's development across the sixteen child outcomes examined. The main effect of using regulated care rather than exclusively parental care is positive for number knowledge, for the copying and writing tasks scored in Who Am I?, for Motor and Social Development at age 2-3, for problem-solving at age 2-3, and for personal skills at age 2-3. Regulated child care also has desirable effects on two measures of behaviour (and no undesirable effects): pro-social behaviour measured at age 8-9, and indirect aggression at ages 4 through 7.

Using unregulated care by a non-relative rather than exclusively parental care has some of the same main effects on children as does regulated child care. In particular, using unregulated care by a non-relative is positive for number knowledge, for the copying and writing tasks scored in Who Am I?, and for

personal skills at age 2-3. However, this type of care is associated with poorer scores on a measure of receptive vocabulary (PPVT-R). Unregulated non-relative child care has desirable effects on two measures of behaviour.

Using unregulated care by a relative rather than exclusively parental care has a positive effect on personal skills at age 2-3, but otherwise has no significant positive or negative effects on cognitive, language, pre-math and math, or general development measures. There are, however, desirable effects on two measures of behaviour (and no undesirable effects): pro-social behaviour measured at age 8-9, and indirect aggression at ages 4 through 7.

Longer hours of child care in a week has undesirable effects on number knowledge at age 4-5, but desirable effects on fine motor skills as measured by Ages and Stages at age 2-3, and on emotional disorder from ages 4-7. The number of individual types of child care used in a week has undesirable effects on math scores in Grades 2 and 3, on emotional disorder at ages 4-7 and on indirect aggression at ages 4-7, but no significant effects on other child outcomes.

CHILDREN FROM IMMIGRANT FAMILIES

Using child care of different types, hours and number of types of care does not necessarily have the same effects on all children. For instance, use of regulated, unregulated non-relative or unregulated relative care by immigrant children is associated with less desirable scores on the copying and writing tasks of Who Am I? Further, use of regulated care or care by a relative is associated with less desirable scores on indirect aggression at ages 4-7 and on fine motor scores as measured by Ages and Stages at age 2-3. However, increased hours of non-parental care have desirable effects on immigrant children. Increased hours are associated with better results on PPVT-R, on Who Am I?, on indirect aggression at ages 4-7, on communications skills and fine motor skills as measured by Ages and Stages at age 2-3. The multiple use of types of care in one week is associated with negative effects on PPVT-R for immigrant children and undesirable effects on the Health Utility Index. Otherwise, the main effects of child care described above apply to immigrant children.

CHILDREN IN LONE MOTHER FAMILIES

Use of any type of care other than parental care by children of lone mothers is associated with substantially worse results on number knowledge and Who Am I? at age 4-5, and use of unregulated care by a non-relative is associated with worse results on math scores in Grades 2 and 3. In addition, use of regulated care by children of lone mothers at ages 0-1 and 2-3 has negative effects on the score of personal skills measured by Ages and Stages at age 2-3. Further, use of regulated care will have undesirable effects on indirect aggression at ages 4-7 and on the Health Utility Index. Use of care by a relative will have undesirable effects on indirect aggression.

The use of longer hours of care by children from lone mother families is

associated with a mix of desirable and undesirable effects. There are positive effects on number knowledge at age 4-5, negative effects on motor and social development at age 2-3, desirable effects on pro-social behaviour at age 8-9 and physical aggression at age 4-7, but undesirable effects on hyperactivity and inattention at age 4-7. The use of multiple types of care in a week has, perhaps surprisingly, a number of positive effects on the children of lone mothers. There are desirable effects on PPVT-R, on Who Am I?, on Scaled Math Scores, and on indirect aggression. However, it is also associated with decreased scores on pro-social behaviour.

CHILDREN IN RURAL FAMILIES

For unregulated non-relative care and for unregulated care by a relative, there are no significant differences in their effects on rural children in comparison to urban children. However, regulated care is associated with worse scores on problem-solving for rural children at age 2-3, better scores on pro-social behaviour at age 8-9, and worse results on indirect aggression at age 4-7. Hours of care generally has the same effect on rural children as it does on urban children. Number of types of care used in a week has a differential negative effect on rural children for number knowledge and Who Am I? measured at age 4-5, an undesirable effect on hyperactivity and inattention at age 4-7, but a desirable effect on indirect aggression at the same ages.

CHILDREN IN OFFICIAL LANGUAGE MINORITY FAMILIES

There are some differences in the effects of different types of care on children from official language minority families. Regulated care is associated with a strong positive effect on PPVT-R scores, but no differentiation on other child outcomes. Unregulated care by a non-relative has a strong positive effect on Who Am I? scores at age 4-5, but a strong negative effect on motor and social development at age 2-3, and on communication skills at age 2-3. There is a desirable effect on the frequency of nose and throat infections.

Apart from a significant negative effect on PPVT-R, hours of care does not have a differential effect for official language minority children. An increase in the number of types of child care used in a week is associated with a large positive effect on scaled math scores at Grades 2-3, but otherwise with no differential effects on official language minority children.

The effects described above are not purely causal effects, but are some mix of effects which are causal, due to selection, or due to inadequate statistical controls for initial child ability and for the varying quality of child care arrangements.

Data and Methodological Limitations

The NLSCY has strengths and weaknesses for the investigations described in this paper. It collects good information on the types, hours, and expenditures on non-parental child care used by families in which a mother is employed or

studying. However, the information it collects on parental care is in the nature of a residual – parental care is the absence of any non-parental care. This obscures some potentially valuable information about categories and hours of parental care. The NLSCY has information about centre-based care, but the information collected on regulated/licensed family-based care relies on parents' ability to distinguish this from unregulated family-based care. This is perhaps unavoidable, but introduces some error. Further, the NLSCY does not have reliable information on child care use by families in which the mother is not employed or studying.

The NLSCY does not have objective data on the quality, price or convenience/accessibility of different types of child care. This affects analyses of the determinants of use patterns, and the effects of child care on child development.

Despite these significant limitations, it is the best available data in Canada for analyzing both child care use patterns and links between child care and child development, and it deserves more intensive use for analysis of these issues. In particular, for analysis of child care use or child development for groups that comprise only a fraction of the Canadian population (groupings by age, region or demographics), the large sample size of the NLSCY is indispensable.

The data limitations of the NLSCY are linked to methodological limitations of this study. Price, quality and convenience are omitted variables in the analysis of the determinants of child care use patterns. To the extent that price, quality and convenience are correlated with the included variables, those included variables are measured with bias. Sometimes, this causes no particular problem (e.g., interpreting "living in Quebec" as a price variable, more than a geographic or cultural variable). In other cases, the biases are less obvious, and may cause misinterpretations.

The methodological limitations of our study of the links between child care, population group membership and child development have been discussed at the end of the last section. Absence of objective information on the quality of different types of child care may bias the estimates of the effects of child care type. This may be particularly true if the child, mother and family variables included in regressions do not account well for selection effects that are particular to a specific population group. For instance, if members of a particular population group are more likely to choose/have available poorer quality child care for reasons not accounted for in our regressions, the effects of child care type will be measured with bias.

Further, our regressions do not control for initial child ability (measured at the same time as the child care use). As a result, the dependent variable in regressions is the "level" of child ability rather than its change since the child care experience took place. If our child, mother and family variables do not fully control for initial child ability, and differences in these levels of ability are correlated with the use of particular types of child care by particular population

groups, then our estimates of the effects of child care will provide biased estimates of the changes in child development due to different child care choices.

Suggestions for Future Research

Lone mothers' use of child care and the effects of this child care on child development have occasionally been analyzed as distinct topics of interest, but similar attention to other population groups has been very rare to nonexistent. This study is the beginning rather than the end of this important research agenda.

We have analyzed immigrant families as if they were a homogeneous group. It is much more likely that immigrants from different regions of origin differ in important ways related to child-rearing traditions and views of the nature of childhood. It would be useful to distinguish in empirical analyses between different groups of immigrant families. Presuming that immigrant families may become more similar in child care decisions to non-immigrants over time, it may be useful to distinguish immigrant groups according to the length of time since immigration. It would also be useful to analyze the child care decisions of second-generation vs. first-generation immigrant families.

The same logic applies to lone mother families. Some research has found that never-married lone mothers behave differently (in relation to marriage and labour force participation) from lone mothers who are widowed, separated or divorced. This is likely to be true for child care decisions, and perhaps for the influences of child care on child development.

We do not know of a similar breakdown for rural families that might be the basis for distinct investigations. However, it would be of interest to see whether Canadians living in small towns behave very similarly to rural families in terms of child care decisions and the influences of child care on child development. Better controls for the differential availability of regulated child care in rural areas would permit researchers to determine whether different child care decisions are more related to preference or to availability.

Official language minority families are of two distinct types: English-speakers in Francophone parts of Canada and French-speakers in Anglophone parts of Canada. Although sample size might be an issue for the NLSCY, it would make sense to study the child care decisions and child development effects for these groups separately.

Future work with the NLSCY on analysis of the determinants of child care decisions and on analysis of links between child care and child development should seek to incorporate better data on price, convenience, quality and on the wage rate per hour of mothers and fathers. Some of this could come from manipulating data currently in the NLSCY (parents are asked questions related to quality and accessibility and there is information on weekly expenditures and weekly hours of care) and this could be supplemented with external information linked to geographic and age-of-child variables in the NLSCY.

Child development regressions using the NLSCY need both better controls for prior child ability and better measures of parental investments. It is likely, given the rich base of information in the NLSCY, that reasonable measures of these can be included to better control for factors that confound the identification of the effects of child care on child development.

Our regressions in Tables 18, 19 and 20 find a pattern of main effects of child care on child development that are uniformly positive. This differs from the main line of findings from empirical Canadian research that has used NLSCY data (see the literature review for details). If this pattern of positive effects survives the use of better controls for prior child ability and parental investments, research should attempt to determine the source of these apparently different findings.

Policy Recommendations

This paper has not oriented its investigation towards drawing policy recommendations from its analysis of patterns of child care use and determinants of child development. In order to draw policy recommendations, it would be valuable to have evidence about lack of satisfaction with child care, inability to access preferred types of child care, unacceptably poor quality of available child care, or hardship in attempting to afford necessarily high expenditures in order to purchase reasonable quality child care.

We have analyzed evidence that about one in six current users of child care would prefer to use some other type of care. High cost, lack of availability and long waiting lists were cited as major reasons for the failure to fulfill preferences. High cost is particularly cited as a concern by immigrant families, lone mother families and official language minority families. Availability issues are particularly important to rural families. Waiting lists are particularly cited as a concern by immigrant and lone mother families.

Buttressing the evidence that cost is a concern is the data on weekly expenditures on child care. There are two types of response to high cost. One is to avoid it and the other to pay it; both arguably are reflections of hardship. There are a large number of families who use parent or relative care and do not have to pay for child care, but who bear a considerable time burden of caring for their own children while the mother is employed. Those who pay for child care pay, on average, about $100 per week. Usually the ability to pay for child care involves a comparison between the mother's earnings and the cost of care; this average price of care would be a substantial proportion of the typical mother's weekly earnings. Immigrant families and official language minority families are particularly likely to have large expenditures on child care. Immigrant families and rural families are particularly likely to use exclusively parental care while the mother is employed or studying.

Another approach to policy recommendations is to examine potential sources of market failure and to recommend that policy pay special attention to the ways in which child care markets are likely to deliver sub-optimal results. Our previous analysis of child care markets (Cleveland, Forer et al., 2008) has suggested that, left to their own devices, child care markets are likely to suffer from problems of poor quality and affordability. In other words, that if parents have to rely only on their own resources, they will invest too little in good quality child care services (particularly because of the relatively high cost of good quality care).

This study does not have evidence on the current quality of child care in Canada, but other sources (e.g., Cleveland et al, 2008) find that regulated care is on average better than other types of non-parental child care, but that the quality in regulated care is insufficient for optimal child development. The new information that this study provides to this discussion comes in two parts. First, that over the last 12 years, Canadian families in general and from all of our four population groups in particular have moved strongly towards the use of regulated child care for their young children. This suggests that public investments to enhance the quality of regulated child care will help Canadian children across the spectrum.

Second, that there is evidence that, at least in terms of main effects, regulated child care has a pattern of positive effects on children's development. This too may suggest that investments in the quality of child care will bear important fruits in terms of children's development.

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Table A-1: Mean Proportions of Categorical Variables Across Population Groups and Overall

Variable Name	Immigrant	Not immigrant	Lone Mother	Couple	Rural	Urban	Official Lang. Minority	Not OLM	All
Marital status									
Single parent	.071**	.125	n.a.	n.a.	.097*	.117	.060**	.117	.115
Couple parent	.929**	.875	n.a.	n.a.	.903*	.883	.940**	.883	.885
Mother's work hours									
Work hours >= 40	.333**	.348	.362**	.343	.316**	.349	.363**	.344	.345
Work hours 30-39	.314**	.330	.293**	.328	.322**	.325	.377**	.320	.324
Work hours 20-29	.136**	.164	.126**	.161	.157**	.157	.153**	.158	.157
Work hours < 20	.120**	.129	.093**	.131	.180**	.120	.072**	.131	.126
Mother is student only	.098**	.029	.127**	.037	.025**	.050	.048**	.035	.047
Mother's work shift									
Moth. Day shift	.544**	.592	.454**	.594	.537**	.582	.594**	.576	.577
Moth. Day shift + wknds	.148**	.150	.191**	.143	.193**	.143	.150**	.149	.148
Moth. Evening or night shift	.088**	.061	.065**	.070	.051**	.071	.055**	.070	.069
Moth. Rotating or irregular shift	.122**	.168	.165**	.157	.194**	.154	.166**	.157	.158
Mother is student only	.097**	.029	.124**	.037	.025**	.049	.035**	.048	.047
Mother's self-employment									
Mother is self-employed	.086**	.121	.044**	.121	.177**	.104	.107	.113	.112
Mother is not self-employed	.914**	.879	.956**	.879	.823**	.896	.893	.887	.888
Mother's income									
Moth inc 0-10,000	.232**	.181	.309**	.182	.251**	.190	.160**	.200	.196
Moth inc 10,001-21,000	.205**	.213	.265**	.206	.240**	.210	.164**	.216	.213
Moth inc 21,001-32,000	.201**	.219	.166**	.218	.235**	.209	.232**	.211	.212
Moth inc 32,001-48,000	.159**	.198	.169**	.190	.164**	.190	.203**	.187	.188
Moth inc 48,001+	.203**	.189	.092**	.204	.110**	.201	.242**	.187	.191
Household income									
Hhld inc. 0-44,000	.221**	.182	.721**	.128	.235**	.193	.142**	.201	.198
Hhld inc. 44,001-65,000	.211**	.199	.160**	.205	.284**	.189	.144**	.205	.200
Hhld inc. 65,001-85,000	.198**	.206	.065**	.224	.241**	.201	.242**	.203	.205
Hhld inc. 85,001-112,000	.170**	.210	.025**	.219	.161**	.201	.226**	.195	.196
Hhld inc. 112,001+	.200**	.203	.029**	.223	.078**	.216	.246**	.198	.201

Table A-1: Mean Proportions of Categorical Variables Across Population Groups and Overall (cont.)

Variable Name	Immigrant	Not immigrant	Lone Mother	Couple	Rural	Urban	Official Lang. Minority	Not OLM	All
Household income									
Hhld inc. 0-44,000	.221**	.182	.721**	.128	.235**	.193	.142**	.201	.198
Hhld inc. 44,001-65,000	.211**	.199	.160**	.205	.284**	.189	.144**	.205	.200
Hhld inc. 65,001-85,000	.198**	.206	.065**	.224	.241**	.201	.242**	.203	.205
Hhld inc. 85,001-112,000	.170**	.210	.025**	.219	.161**	.201	.226**	.195	.196
Hhld inc. 112,001+	.200**	.203	.029**	.223	.078**	.216	.246**	.198	.201
Mother's education									
Moth. No post-sec	.202**	.178	.347**	.164	.237**	.179	.139**	.189	.185
Moth. Some post-sec	.098**	.135	.210**	.117	.152**	.125	.097**	.129	.128
Moth. College compl.	.255**	.321	.297**	.303	.361**	.295	.304**	.302	.302
Moth. Univ. degree	.444**	.366	.147**	.416	.251**	.401	.460**	.379	.385
1+ Non-biological parent?									
No	.908**	.842	.008**	.967	.860	.854	.926**	.851	.855
Yes	.092**	.158	.992**	.033	.140	.146	.074**	.149	.145
Number of children in family									
Number of children 0-17 = 1	.303	.311	.453**	.294	.256**	.319	.309	.312	.312
Number of children 0-17 = 2	.480	.480	.367**	.493	.493**	.476	.494	.477	.478
Number of children 0-17 = 3+	.217	.209	.180**	.214	.251**	.205	.197	.211	.210
Birth order									
First-born	.469	.476	.560**	.464	.455**	.477	.468	.475	.475
Second-born	.385	.382	.288**	.393	.365**	.383	.378	.381	.381
Third-born or higher	.146	.143	.152**	.143	.180**	.140	.154	.144	.144
Hours/wk non-parental care									
0	.318**	.287	.176**	.312	.311**	.294	.241**	.299	.296
1-19.9	.157**	.196	.161**	.191	.229**	.182	.219**	.185	.187
20 – 29.9	.127**	.144	.140**	.139	.135**	.140	.112**	.142	.139
30 – 39.9	.134**	.147	.176**	.138	.135**	.143	.145**	.142	.143
40 plus	.263**	.225	.348**	.220	.192**	.241	.282**	.233	.235

Table A-1: Mean Proportions of Categorical Variables Across Population Groups and Overall (cont.)

Variable Name	Immigrant	Not immigrant	Lone Mother	Couple	Rural	Urban	OLM	Not OLM	All
# types of non-parental arrangement, 1+ hours/wk									
0	.318**	.287	.176**	.312	.310**	.294	.241**	.299	.296
1	.652**	.649	.771**	.634	.614**	.654	.714**	.646	.650
2 or more	.029**	.064	.053**	.055	.076**	.052	.045**	.055	.055
Weekly child care expenses									
Weekly exp = $0	.209**	.130	.206**	.142	.152**	.151	.111**	.155	.151
Weekly exp $1-$50	.257**	.370	.343**	.339	.382**	.334	.342**	.338	.339
Weekly exp $51-$100	.188**	.205	.193**	.203	.265**	.193	.244**	.199	.201
Weekly exp $101+	.346**	.295	.259**	.316	.201**	.321	.302**	.308	.308
PMK depression score									
0 -11	.921**	.936	.817**	.948	.944	.931	suppressed		.932
12-23	.063**	.057	.155**	.046	.052	.059			.059
24-36	.016**	.007	.028**	.007	.004	.010			.009
Family functioning									
Family is low-functional	.200**	.136	.309**	.135	.133**	.158	.148	.153	.156
Family is not low-functional	.800**	.864	.691**	.865	.867**	.842	.852	.847	.844
Positive parenting									
Parenting is positive	.810**	.878	.825**	.864	.875	.857	.852	.860	.859
Parenting is not positive	.190**	.122	.175**	.136	.125	.143	.148	.140	.141
Effectiveness of parenting									
Parenting is ineffective	.117**	.101	.139**	.102	.102	.107	.111	.106	.107
Parenting is effective	.883**	.899	.861**	.898	.898	.893	.889	.894	.893
Region									
Atlantic Provinces	.018**	.087	.084**	.067	.161**	.057	.154**	.063	.069
Quebec	.194**	.266	.193**	.249	.267**	.240	.332**	.236	.243
Ontario	.501**	.342	.391**	.394	.267**	.410	.363**	.396	.394
Western Provinces	.288**	.305	.332**	.290	.306**	.293	.152**	.304	.295

Table A-2: Means and Standard Deviations of Continuous Variables Across Population Groups and Overall

Variable Name	Immigrant	Not immigrant	Lone Mother	Couple	Rural	Urban	Official Lang. Minority	Not Offic. Lang. Minority	All
Birth weight (kg)									
Mean	3.31**	3.44	3.39	3.40	3.45**	3.39	3.45**	3.40	3.40
SD	0.56	0.57	0.57	0.58	0.58	0.57	0.56	0.58	0.58
Child age in months									
Mean	36.99	37.48	38.94**	37.28	38.90**	37.29	37.91	37.50	37.47
SD	18.50	18.57	17.77	18.56	18.40	18.48	18.17	18.49	18.48
Hours/wk in non-parental care									
Mean	20.52	19.98	25.91**	19.29	17.95**	20.32	22.34**	19.92	20.06
SD	18.41	17.26	17.47	17.41	16.93	17.60	18.39	17.48	17.55
# individual non-parental arrangements, 1+ hours/wk									
Mean	0.74**	0.82	0.91**	0.78	0.82	0.79	0.82	0.79	0.80
SD	0.57	0.63	0.53	0.63	0.69	0.61	0.54	0.62	0.62
Age of mother at birth of child									
Mean	30.85**	29.31	26.55**	30.10	28.42**	29.83	30.17**	29.63	29.68
SD	5.04	5.03	5.92	4.83	4.93	5.10	5.04	5.11	5.10
Mother's income ($1,000s)									
Mean	31.58	31.63	23.19**	32.55	24.52**	32.32	37.16**	31.01	31.45
SD	36.00	28.22	24.90	30.63	18.87	31.18	42.44	28.46	30.17
Household income ($1,000s)									
Mean	84.41	84.32	37.66**	88.92	68.49**	85.72	97.13**	82.92	83.82
SD	66.21	54.32	29.86	57.23	36.53	59.05	71.93	55.65	57.26

Appendix B
Crosstabulations: Some Factors Associated with Child Care Use Patterns

Demographic Breakdowns for Each Sub-Population

Primary Child Care Arrangement by Age of Child, NLSCY Cycle 7

Primary care by Child Age, Children of lone vs. couple parents, cycle 7

Child of lone parent?, cycle 7			Primary care, kindergarten excluded, cycle 7				Total
			Regulated	Unregulated non-relative	Unregulated relative	Parent/family only	
No	Child age, three categories, cycle 7	0 to 1	95,322	40,996	54,680	128,241	319,239
			29.9%	12.8%	17.1%	40.2%	100.0%
		2 to 3	192,989	59,667	59,293	104,261	416,210
			46.4%	14.3%	14.2%	25.1%	100.0%
		4 to 5	147,866	54,235	59,423	113,486	375,010
			39.4%	14.5%	15.8%	30.3%	100.0%
	Total		436,177	154,898	173,396	345,988	1,110,459
			39.3%	13.9%	15.6%	31.2%	100.0%
Yes	Child age, three categories, cycle 7	0 to 1	15,102	2,488	9,235	8,878	35,703
			42.3%	7.0%	25.9%	24.9%	100.0%
		2 to 3	33,138	7,931	9,564	7,287	57,920
			57.2%	13.7%	16.5%	12.6%	100.0%
		4 to 5	28,609	7,017	8,025	9,719	53,370
			53.6%	13.1%	15.0%	18.2%	100.0%
	Total		76,849	17,436	26,824	25,884	146,993
			52.3%	11.9%	18.2%	17.6%	100.0%

Primary care by Child Age, Children of rural vs. urban parents, cycle 7

Child of rural parent?, cycle 7			Primary care, kindergarten excluded, cycle 7				Total
			Regulated	Unregulated non-relative	Unregulated relative	Parent/family only	
No	Child age, three categories, cycle 7	0 to 1	100,683	37,544	56,311	124,084	318,622
			31.6%	11.8%	17.7%	38.9%	100.0%
		2 to 3	207,745	57,257	60,053	97,896	422,951
			49.1%	13.5%	14.2%	23.1%	100.0%
		4 to 5	159,408	53,040	57,653	106,728	376,829
			42.3%	14.1%	15.3%	28.3%	100.0%
	Total		467,836	147,841	174,017	328,708	1,118,402
			41.8%	13.2%	15.6%	29.4%	100.0%
Yes	Child age, three categories, cycle 7	0 to 1	9,741	5,940	7,604	13,035	36,320
			26.8%	16.4%	20.9%	35.9%	100.0%
		2 to 3	18,382	10,341	8,804	13,653	51,180
			35.9%	20.2%	17.2%	26.7%	100.0%
		4 to 5	17,066	8,211	9,795	16,477	51,549
			33.1%	15.9%	19.0%	32.0%	100.0%
	Total		45,189	24,492	26,203	43,165	139,049
			32.5%	17.6%	18.8%	31.0%	100.0%

Primary care by Child Age, Children of immigrant vs. non-immigrant parents, cycle 7

Child of one or both immigrant parents?, cycle 7			Primary care, kindergarten excluded, cycle 7				Total
			Regulated	Unregulated non-relative	Unregulated relative	Parent/family only	
No	Child age, three categories, cycle 7	0 to 1	85,903	34,091	40,104	99,950	260,048
			33.0%	13.1%	15.4%	38.4%	100.0%
		2 to 3	159,567	52,965	42,115	75,854	330,501
			48.3%	16.0%	12.7%	23.0%	100.0%
		4 to 5	134,100	48,441	47,819	83,906	314,266
			42.7%	15.4%	15.2%	26.7%	100.0%
	Total		379,570	135,497	130,038	259,710	904,815
			42.0%	15.0%	14.4%	28.7%	100.0%
Yes	Child age, three categories, cycle 7	0 to 1	24,179	9,315	23,513	34,857	91,864
			26.3%	10.1%	25.6%	37.9%	100.0%
		2 to 3	56,259	9,693	21,952	30,570	118,474
			47.5%	8.2%	18.5%	25.8%	100.0%
		4 to 5	37,359	12,381	17,632	33,824	101,196
			36.9%	12.2%	17.4%	33.4%	100.0%
	Total		117,797	31,389	63,097	99,251	311,534
			37.8%	10.1%	20.3%	31.9%	100.0%

Primary care by Child Age, Children of official minority language vs. not official minority language parents, cycle 7

PMK, spouse or both first learned and still understands the minority official language, cycle 7			Primary care, kindergarten excluded, cycle 7				
			Regulated	Unregulated non-relative	Unregulated relative	Parent/family only	Total
No	Child age, three categories, cycle 7	0 to 1	102,423	40,041	60,957	128,010	331,431
			30.9%	12.1%	18.4%	38.6%	100.0%
		2 to 3	209,682	61,310	64,156	104,696	439,844
			47.7%	13.9%	14.6%	23.8%	100.0%
		4 to 5	165,053	55,566	62,389	117,474	400,482
			41.2%	13.9%	15.6%	29.3%	100.0%
	Total		477,158	156,917	187,502	350,180	1,171,757
			40.7%	13.4%	16.0%	29.9%	100.0%
Yes	Child age, three categories, cycle 7	0 to 1	6,351	3,365	2,655	7,444	19,815
			32.1%	17.0%	13.4%	37.6%	100.0%
		2 to 3	16,145	6,289	4,646	6,342	33,422
			48.3%	18.8%	13.9%	19.0%	100.0%
		4 to 5	11,421	5,334	5,059	5,669	27,483
			41.6%	19.4%	18.4%	20.6%	100.0%
	Total		33,917	14,988	12,360	19,455	80,720
			42.0%	18.6%	15.3%	24.1%	100.0%

Primary Child Care Arrangement by Mother's Education, NLSCY Cycle 7

Primary care by Mother's Education, Children of lone vs. couple parents, cycle 7

Child of lone parent?, cycle 7			Primary care, kindergarten excluded, cycle 7				Total
			Regulated	Unregulated non-relative	Unregulated relative	Parent/family only	
No	Mother highest education, 4 categories	No post-secondary	54,741	20,922	35,030	68,345	179,038
			30.6%	11.7%	19.6%	38.2%	100.0%
		Some post-secondary	50,811	12,612	22,862	41,790	128,075
			39.7%	9.8%	17.9%	32.6%	100.0%
		College certificate or diploma	128,120	45,715	53,632	102,351	329,818
			38.8%	13.9%	16.3%	31.0%	100.0%
		University degree	191,970	74,792	60,524	125,948	453,234
			42.4%	16.5%	13.4%	27.8%	100.0%
	Total		425,642	154,041	172,048	338,434	1,090,165
			39.0%	14.1%	15.8%	31.0%	100.0%
Yes	Mother highest education, 4 categories	No post-secondary	22,188	4,310	12,655	10,171	49,324
			45.0%	8.7%	25.7%	20.6%	100.0%
		Some post-secondary	15,875	2,884	5,032	6,096	29,887
			53.1%	9.6%	16.8%	20.4%	100.0%
		College certificate or diploma	25,781	5,326	5,769	5,390	42,266
			61.0%	12.6%	13.6%	12.8%	100.0%
		University degree	11,095	4,830	2,585	2,408	20,918
			53.0%	23.1%	12.4%	11.5%	100.0%
	Total		74,939	17,350	26,041	24,065	142,395
			52.6%	12.2%	18.3%	16.9%	100.0%

Primary care by Mother's Education, Children of rural vs. urban parents, cycle 7

Child of rural parent?, cycle 7			Primary care, kindergarten excluded, cycle 7				Total
			Regulated	Unregulated non-relative	Unregulated relative	Parent/family only	
No	Mother highest education, 4 categories	No post-secondary	69,257	21,302	39,790	65,981	196,330
			35.3%	10.9%	20.3%	33.6%	100.0%
		Some post-secondary	60,369	12,304	23,970	40,773	137,416
			43.9%	9.0%	17.4%	29.7%	100.0%
		College certificate or diploma	138,518	40,789	49,401	94,588	323,296
			42.8%	12.6%	15.3%	29.3%	100.0%
		University degree	188,924	72,502	59,175	119,571	440,172
			42.9%	16.5%	13.4%	27.2%	100.0%
	Total		457,068	146,897	172,336	320,913	1,097,214
			41.7%	13.4%	15.7%	29.2%	100.0%
Yes	Mother highest education, 4 categories	No post-secondary	7,672	3,930	7,895	12,535	32,032
			24.0%	12.3%	24.6%	39.1%	100.0%
		Some post-secondary	6,318	3,191	3,924	7,113	20,546
			30.8%	15.5%	19.1%	34.6%	100.0%
		College certificate or diploma	15,383	10,252	10,001	13,153	48,789
			31.5%	21.0%	20.5%	27.0%	100.0%
		University degree	14,141	7,119	3,934	8,785	33,979
			41.6%	21.0%	11.6%	25.9%	100.0%
	Total		43,514	24,492	25,754	41,586	135,346
			32.2%	18.1%	19.0%	30.7%	100.0%

Primary care by Mother's Education, Children of immigrant vs. non-immigrant parents, cycle 7

Child of one or both immigrant parents?, cycle 7			Primary care, kindergarten excluded, cycle 7				Total
			Regulated	Unregulated non-relative	Unregulated relative	Parent/family only	
No	Mother highest education, 4 categories	No post-secondary	50,404	19,055	32,671	55,203	157,333
			32.0%	12.1%	20.8%	35.1%	100.0%
		Some post-secondary	53,018	11,104	22,645	32,914	119,681
			44.3%	9.3%	18.9%	27.5%	100.0%
		College certificate or diploma	121,600	45,106	40,934	77,276	284,916
			42.7%	15.8%	14.4%	27.1%	100.0%
		University degree	145,290	59,523	31,923	87,771	324,507
			44.8%	18.3%	9.8%	27.0%	100.0%
	Total		370,312	134,788	128,173	253,164	886,437
			41.8%	15.2%	14.5%	28.6%	100.0%
Yes	Mother highest education, 4 categories	No post-secondary	23,701	4,313	12,495	21,479	61,988
			38.2%	7.0%	20.2%	34.7%	100.0%
		Some post-secondary	11,563	2,951	4,573	10,993	30,080
			38.4%	9.8%	15.2%	36.5%	100.0%
		College certificate or diploma	28,538	5,087	17,236	27,321	78,182
			36.5%	6.5%	22.0%	34.9%	100.0%
		University degree	51,673	18,802	28,727	36,818	136,020
			38.0%	13.8%	21.1%	27.1%	100.0%
	Total		115,475	31,153	63,031	96,611	306,270
			37.7%	10.2%	20.6%	31.5%	100.0%

Primary care by Mother's Education, Children of official minority language vs. not official minority language parents, cycle 7

PMK, spouse or both first learned and still understands the minority official language, cycle 7			Primary care, kindergarten excluded, cycle 7				
			Regulated	Unregulated non-relative	Unregulated relative	Parent/family only	Total
No	Mother highest education, 4 categories	No post-secondary	73,855	22,542	46,035	74,420	216,852
			34.1%	10.4%	21.2%	34.3%	100.0%
		Some post-secondary	61,026	14,709	26,093	46,380	148,208
			41.2%	9.9%	17.6%	31.3%	100.0%
		College certificate or diploma	142,197	48,217	54,778	101,973	347,165
			41.0%	13.9%	15.8%	29.4%	100.0%
		University degree	187,695	70,514	58,554	118,769	435,532
			43.1%	16.2%	13.4%	27.3%	100.0%
	Total		464,773	155,982	185,460	341,542	1,147,757
			40.5%	13.6%	16.2%	29.8%	100.0%
Yes	Mother highest education, 4 categories	No post-secondary	2,963	2,659	1,464	4,067	11,153
			26.6%	23.8%	13.1%	36.5%	100.0%
		Some post-secondary	4,164	787	1,782	1,001	7,734
			53.8%	10.2%	23.0%	12.9%	100.0%
		College certificate or diploma	11,628	2,787	4,623	5,223	24,261
			47.9%	11.5%	19.1%	21.5%	100.0%
		University degree	15,103	8,748	4,400	8,428	36,679
			41.2%	23.9%	12.0%	23.0%	100.0%
	Total		33,858	14,981	12,269	18,719	79,827
			42.4%	18.8%	15.4%	23.4%	100.0%

Primary Child Care Arrangement by Quintiles of Household Income, Cycle 7

(Lone Parents vs. Couple Parents: Suppressed due to one or more cells less than 5 observations)

Primary care by Household Income (Quintiles), Children of rural vs. urban parents, cycle 7

Child of rural parent?, cycle 7			Primary care, kindergarten excluded, cycle 7				Total
			Regulated	Unregulated non-relative	Unregulated relative	Parent/family only	
No	Estimated total household income based on working parents, quintiles	$0 to $44,000	102,001	20,686	34,415	58,680	215,782
			47.3%	9.6%	15.9%	27.2%	100.0%
		$44,001 to $65,000	67,622	22,165	39,018	83,164	211,969
			31.9%	10.5%	18.4%	39.2%	100.0%
		$65,001 to $85,000	84,894	28,566	33,307	77,876	224,643
			37.8%	12.7%	14.8%	34.7%	100.0%
		$85,001 to $112,000	103,731	29,817	34,229	56,583	224,360
			46.2%	13.3%	15.3%	25.2%	100.0%
		$112,001 and up	109,588	46,607	33,048	52,404	241,647
			45.4%	19.3%	13.7%	21.7%	100.0%
	Total		467,836	147,841	174,017	328,707	1,118,401
			41.8%	13.2%	15.6%	29.4%	100.0%
Yes	Estimated total household income based on working parents, quintiles	$0 to $44,000	8,626	3,337	8,772	11,971	32,706
			26.4%	10.2%	26.8%	36.6%	100.0%
		$44,001 to $65,000	14,020	6,182	6,920	12,501	39,623
			35.4%	15.6%	17.5%	31.5%	100.0%
		$65,001 to $85,000	11,548	6,320	6,322	9,375	33,565
			34.4%	18.8%	18.8%	27.9%	100.0%
		$85,001 to $112,000	7,745	5,119	3,293	6,148	22,305
			34.7%	23.0%	14.8%	27.6%	100.0%
		$112,001 and up	3,249	3,536	896	3,170	10,851
			29.9%	32.6%	8.3%	29.2%	100.0%
	Total		45,188	24,494	26,203	43,165	139,050
			32.5%	17.6%	18.8%	31.0%	100.0%

Primary care by Household Income (Quintiles), Children of immigrant vs. non-immigrant parents, cycle 7

Child of one or both immigrant parents?, cycle 7			Primary care, kindergarten excluded, cycle 7				Total
			Regulated	Unregulated non-relative	Unregulated relative	Parent/family only	
No	Estimated total household income based on working parents, quintiles	$0 to $44,000	69,308	18,699	30,244	46,775	165,026
			42.0%	11.3%	18.3%	28.3%	100.0%
		$44,001 to $65,000	61,205	23,492	32,293	63,062	180,052
			34.0%	13.0%	17.9%	35.0%	100.0%
		$65,001 to $85,000	71,988	26,439	27,330	60,574	186,331
			38.6%	14.2%	14.7%	32.5%	100.0%
		$85,001 to $112,000	87,708	29,961	24,381	47,478	189,528
			46.3%	15.8%	12.9%	25.1%	100.0%
		$112,001 and up	89,360	36,905	15,790	41,822	183,877
			48.6%	20.1%	8.6%	22.7%	100.0%
	Total		379,569	135,496	130,038	259,711	904,814
			41.9%	15.0%	14.4%	28.7%	100.0%
Yes	Estimated total household income based on working parents, quintiles	$0 to $44,000	33,958	4,119	10,176	20,576	68,829
			49.3%	6.0%	14.8%	29.9%	100.0%
		$44,001 to $65,000	18,678	4,265	12,401	30,490	65,834
			28.4%	6.5%	18.8%	46.3%	100.0%
		$65,001 to $85,000	22,775	6,405	11,044	21,372	61,596
			37.0%	10.4%	17.9%	34.7%	100.0%
		$85,001 to $112,000	21,921	4,403	12,669	13,830	52,823
			41.5%	8.3%	24.0%	26.2%	100.0%
		$112,001 and up	20,463	12,197	16,807	12,983	62,450
			32.8%	19.5%	26.9%	20.8%	100.0%
	Total		117,795	31,389	63,097	99,251	311,532
			37.8%	10.1%	20.3%	31.9%	100.0%

Primary care by Household Income (Quintiles), Children of official minority language vs. not official minority language parents, cycle 7

PMK, spouse or both first learned and still understands the minority official language, cycle 7			Primary care, kindergarten excluded, cycle 7				Total
			Regulated	Unregulated non-relative	Unregulated relative	Parent/family only	
No	Estimated total household income based on working parents, quintiles	$0 to $44,000	105,107	23,073	41,466	65,251	234,897
			44.7%	9.8%	17.7%	27.8%	100.0%
		$44,001 to $65,000	77,560	26,790	42,875	92,506	239,731
			32.4%	11.2%	17.9%	38.6%	100.0%
		$65,001 to $85,000	89,001	30,434	37,437	80,587	237,459
			37.5%	12.8%	15.8%	33.9%	100.0%
		$85,001 to $112,000	103,113	31,238	33,305	60,396	228,052
			45.2%	13.7%	14.6%	26.5%	100.0%
		$112,001 and up	102,378	45,382	32,418	51,440	231,618
			44.2%	19.6%	14.0%	22.2%	100.0%
	Total		477,159	156,917	187,501	350,180	1,171,757
			40.7%	13.4%	16.0%	29.9%	100.0%
Yes	Estimated total household income based on working parents, quintiles	$0 to $44,000	4,102	949	1,619	4,813	11,483
			35.7%	8.3%	14.1%	41.9%	100.0%
		$44,001 to $65,000	4,083	1,442	2,889	3,158	11,572
			35.3%	12.5%	25.0%	27.3%	100.0%
		$65,001 to $85,000	7,441	4,138	2,192	5,773	19,544
			38.1%	21.2%	11.2%	29.5%	100.0%
		$85,001 to $112,000	8,363	3,697	4,133	2,053	18,246
			45.8%	20.3%	22.7%	11.3%	100.0%
		$112,001 and up	9,928	4,761	1,526	3,658	19,873
			50.0%	24.0%	7.7%	18.4%	100.0%
	Total		33917	14987	12359	19455	80718
			42.0%	18.6%	15.3%	24.1%	100.0%

Primary Child Care Arrangement by Quintiles of Mother's Income, Cycle 7

Primary care by Mother's Income (Quintiles), Children of lone vs. couple parents, cycle 7

Child of lone parent?, cycle 7			Primary care, kindergarten excluded, cycle 7				Total
			Regulated	Unregulated non-relative	Unregulated relative	Parent/family only	
No	Mother's income, quintiles, cycle 7	$0 to $10,000	56,915	17,674	27,884	99,077	201,550
			28.2%	8.8%	13.8%	49.2%	100.0%
		$10,001 to $21,000	67,048	30,856	38,149	92,804	228,857
			29.3%	13.5%	16.7%	40.6%	100.0%
		$21,001 to $32,000	97,572	32,777	41,854	70,076	242,279
			40.3%	13.5%	17.3%	28.9%	100.0%
		$32,001 to $48,000	103,769	33,242	32,365	41,525	210,901
			49.2%	15.8%	15.3%	19.7%	100.0%
		$48,001 and up	110,871	40,271	33,145	42,164	226,451
			49.0%	17.8%	14.6%	18.6%	100.0%
	Total		436,175	154,820	173,397	345,646	1,110,038
			39.3%	13.9%	15.6%	31.1%	100.0%
Yes	Mother's income, quintiles, cycle 7	$0 to $10,000	22,886	3,329	7,645	11,410	45,270
			50.6%	7.4%	16.9%	25.2%	100.0%
		$10,001 to $21,000	21,398	3,513	7,235	6,788	38,934
			55.0%	9.0%	18.6%	17.4%	100.0%
		$21,001 to $32,000	12,615	3,987	4,531	3,140	24,273
			52.0%	16.4%	18.7%	12.9%	100.0%
		$32,001 to $48,000	13,314	3,208	5,344	3,026	24,892
			53.5%	12.9%	21.5%	12.2%	100.0%
		$48,001 and up	6,637	3,399	2,068	1,521	13,625
			48.7%	24.9%	15.2%	11.2%	100.0%
	Total		76,850	17,436	26,823	25,885	146,994
			52.3%	11.9%	18.2%	17.6%	100.0%

Primary care by Mother's Income (Quintiles), Children of rural vs. urban parents, cycle 7

Child of rural parent?, cycle 7			Primary care, kindergarten excluded, cycle 7				Total
			Regulated	Unregulated non-relative	Unregulated relative	Parent/family only	
No	Mother's income, quintiles, cycle 7	$0 to $10,000	72,040	17,736	26,917	95,176	211,869
			34.0%	8.4%	12.7%	44.9%	100.0%
		$10,001 to $21,000	78,672	29,626	37,460	88,570	234,328
			33.6%	12.6%	16.0%	37.8%	100.0%
		$21,001 to $32,000	97,226	29,652	40,951	66,172	234,001
			41.5%	12.7%	17.5%	28.3%	100.0%
		$32,001 to $48,000	107,604	31,836	35,406	38,123	212,969
			50.5%	14.9%	16.6%	17.9%	100.0%
		$48,001 and up	112,295	38,913	33,282	40,324	224,814
			50.0%	17.3%	14.8%	17.9%	100.0%
	Total		467,837	147,763	174,016	328,365	1,117,981
			41.8%	13.2%	15.6%	29.4%	100.0%
Yes	Mother's income, quintiles, cycle 7	$0 to $10,000	7,761	3,267	8,611	15,311	34,950
			22.2%	9.3%	24.6%	43.8%	100.0%
		$10,001 to $21,000	9,774	4,743	7,924	11,021	33,462
			29.2%	14.2%	23.7%	32.9%	100.0%
		$21,001 to $32,000	12,961	7,111	5,435	7,044	32,551
			39.8%	21.8%	16.7%	21.6%	100.0%
		$32,001 to $48,000	9,479	4,614	2,303	6,428	22,824
			41.5%	20.2%	10.1%	28.2%	100.0%
		$48,001 and up	5,214	4,757	1,930	3,361	15,262
			34.2%	31.2%	12.6%	22.0%	100.0%
	Total		45,189	24,492	26,203	43,165	139,049
			32.5%	17.6%	18.8%	31.0%	100.0%

Primary care by Mother's Income (Quintiles), Children of immigrant vs. non-immigrant parents, cycle 7

Child of one or both immigrant parents?, cycle 7			Primary care, kindergarten excluded, cycle 7				Total
			Regulated	Unregulated non-relative	Unregulated relative	Parent/family only	
No	Mother's income, quintiles, cycle 7	$0 to $10,000	44,842	14,981	29,982	74,347	164,152
			27.3%	9.1%	18.3%	45.3%	100.0%
		$10,001 to $21,000	65,798	24,351	31,362	70,927	192,438
			34.2%	12.7%	16.3%	36.9%	100.0%
		$21,001 to $32,000	82,893	31,672	29,913	53,407	197,885
			41.9%	16.0%	15.1%	27.0%	100.0%
		$32,001 to $48,000	98,188	30,189	21,185	29,933	179,495
			54.7%	16.8%	11.8%	16.7%	100.0%
		$48,001 and up	87,848	34,226	17,596	31,096	170,766
			51.4%	20.0%	10.3%	18.2%	100.0%
	Total		379,569	135,419	130,038	259,710	904,736
			42.0%	15.0%	14.4%	28.7%	100.0%
Yes	Mother's income, quintiles, cycle 7	$0 to $10,000	30,058	5,404	4,348	32,355	72,165
			41.7%	7.5%	6.0%	44.8%	100.0%
		$10,001 to $21,000	19,303	6,870	12,207	25,353	63,733
			30.3%	10.8%	19.2%	39.8%	100.0%
		$21,001 to $32,000	25,262	4,650	15,020	17,640	62,572
			40.4%	7.4%	24.0%	28.2%	100.0%
		$32,001 to $48,000	16,286	5,930	15,737	11,616	49,569
			32.9%	12.0%	31.7%	23.4%	100.0%
		$48,001 and up	26,888	8,535	15,786	11,944	63,153
			42.6%	13.5%	25.0%	18.9%	100.0%
	Total		117,797	31,389	63,098	98,908	311,192
			37.9%	10.1%	20.3%	31.8%	100.0%

Primary care by Mother's Income (Quintiles), Children of official minority language vs. not official minority language parents, cycle 7

PMK, spouse or both first learned and still understands the minority official language, cycle 7			Primary care, kindergarten excluded, cycle 7				Total
			Regulated	Unregulated non-relative	Unregulated relative	Parent/family only	
No	Mother's income, quintiles, cycle 7	$0 to $10,000	76,649	19,540	34,161	103,436	233,786
			32.8%	8.4%	14.6%	44.2%	100.0%
		$10,001 to $21,000	82,435	32,085	42,403	95,497	252,420
			32.7%	12.7%	16.8%	37.8%	100.0%
		$21,001 to $32,000	102,375	33,194	42,945	68,446	246,960
			41.5%	13.4%	17.4%	27.7%	100.0%
		$32,001 to $48,000	108,711	33,514	34,423	41,971	218,619
			49.7%	15.3%	15.7%	19.2%	100.0%
		$48,001 and up	106,989	38,506	33,570	40,488	219,553
			48.7%	17.5%	15.3%	18.4%	100.0%
	Total		477,159	156,839	187,502	349,838	1,171,338
			40.7%	13.4%	16.0%	29.9%	100.0%
Yes	Mother's income, quintiles, cycle 7	$0 to $10,000	3,152	1,417	1,321	6,945	12,835
			24.6%	11.0%	10.3%	54.1%	100.0%
		$10,001 to $21,000	4,593	2,252	2,753	3,612	13,210
			34.8%	17.0%	20.8%	27.3%	100.0%
		$21,001 to $32,000	7,736	3,570	3,441	3,940	18,687
			41.4%	19.1%	18.4%	21.1%	100.0%
		$32,001 to $48,000	8,372	2,584	3,202	2,238	16,396
			51.1%	15.8%	19.5%	13.6%	100.0%
		$48,001 and up	10,063	5,164	1,643	2,720	19,590
			51.4%	26.4%	8.4%	13.9%	100.0%
	Total		33,916	14,987	12,360	19,455	80,718
			42.0%	18.6%	15.3%	24.1%	100.0%

Primary Child Care Arrangement by Mother's Education, 1990's vs 2000's

Primary care by Mother's Education, Early (cycles 1-3) vs. Late (cycles 4-7)

Children up to Age 5, Lone Mother Parents

Early (cycles 1-3) vs. Late (cycles 4-7)			Primary care, 4 categories, based on hours, kindergarten excluded				Total
			Regulated	Unregulated non-relative	Unregulated relative	Parent/family only	
Early	Mother highest education, 4 categories	No post-secondary	12,529	10,906	7,154	11,438	42,027
			29.8%	25.9%	17.0%	27.2%	100.0%
		Some post-secondary	17,953	9,688	10,271	10,397	48,309
			37.2%	20.1%	21.3%	21.5%	100.0%
		College certificate or diploma	10,601	6,089	3,084	5,499	25,273
			41.9%	24.1%	12.2%	21.8%	100.0%
		University degree	4,193	3,005	789	3,666	11,653
			36.0%	25.8%	6.8%	31.5%	100.0%
	Total		45,276	29,688	21,298	31,000	127,262
			35.6%	23.3%	16.7%	24.4%	100.0%
Late	Mother highest education, 4 categories	No post-secondary	19,572	9,243	11,328	10,822	50,965
			38.4%	18.1%	22.2%	21.2%	100.0%
		Some post-secondary	12,743	4,375	4,977	4,963	27,058
			47.1%	16.2%	18.4%	18.3%	100.0%
		College certificate or diploma	18,216	4,789	6,864	5,380	35,249
			51.7%	13.6%	19.5%	15.3%	100.0%
		University degree	9,076	3,621	2,421	2,154	17,272
			52.5%	21.0%	14.0%	12.5%	100.0%
	Total		59,607	22,028	25,590	23,319	130,544
			45.7%	16.9%	19.6%	17.9%	100.0%

Primary care by Mother's Education, Early (cycles 1-3) vs. Late (cycles 4-7)

Children up to Age 5, Rural Parents

Early (cycles 1-3) vs. Late (cycles 4-7)			Primary care, kindergarten excluded				Total
			Regulated	Unregulated non-relative	Unregulated relative	Parent/family only	
Early	Mother highest education, 4 categories	No post-secondary	3,674	9,338	6,642	19,095	38,749
			9.5%	24.1%	17.1%	49.3%	100.0%
		Some post-secondary	6,428	12,150	7,232	14,644	40,454
			15.9%	30.0%	17.9%	36.2%	100.0%
		College certificate or diploma	6,106	14,207	6,802	13,786	40,901
			14.9%	34.7%	16.6%	33.7%	100.0%
		University degree	4,065	7,266	2,937	6,325	20,593
			19.7%	35.3%	14.3%	30.7%	100.0%
	Total		20,273	42,961	23,613	53,850	140,697
			14.4%	30.5%	16.8%	38.3%	100.0%
Late	Mother highest education, 4 categories	No post-secondary	8,602	6,364	8,361	14,142	37,469
			23.0%	17.0%	22.3%	37.7%	100.0%
		Some post-secondary	6,025	4,778	4,182	7,066	22,051
			27.3%	21.7%	19.0%	32.0%	100.0%
		College certificate or diploma	10,398	9,371	8,020	10,725	38,514
			27.0%	24.3%	20.8%	27.8%	100.0%
		University degree	8,582	7,915	3,348	6,352	26,197
			32.8%	30.2%	12.8%	24.2%	100.0%
	Total		33,607	28,428	23,911	38,285	124,231
			27.1%	22.9%	19.2%	30.8%	100.0%

Mother highest education by Primary care, kindergarten excluded by Early (cycles 1-3) vs. Late (cycles 4-7)

Children up to Age 5, Immigrant Parents

Early (cycles 1-3) vs. Late (cycles 4-7)			Primary care, kindergarten excluded				Total
			Regulated	Unregulated non-relative	Unregulated relative	Parent/family only	
Early	Mother highest education, 4 categories	No post-secondary	8,637	6,756	11,975	28,202	55,570
			15.5%	12.2%	21.5%	50.8%	100.0%
		Some post-secondary	10,556	14,212	14,091	19,031	57,890
			18.2%	24.6%	24.3%	32.9%	100.0%
		College certificate or diploma	11,459	12,951	15,508	22,334	62,252
			18.4%	20.8%	24.9%	35.9%	100.0%
		University degree	17,577	18,377	11,077	22,138	69,169
			25.4%	26.6%	16.0%	32.0%	100.0%
	Total		48,229	52,296	52,651	91,705	244,881
			19.7%	21.4%	21.5%	37.4%	100.0%
Late	Mother highest education, 4 categories	No post-secondary	13,963	7,949	15,783	29,463	67,158
			20.8%	11.8%	23.5%	43.9%	100.0%
		Some post-secondary	9,850	5,225	8,659	12,611	36,345
			27.1%	14.4%	23.8%	34.7%	100.0%
		College certificate or diploma	20,903	7,544	19,977	25,053	73,477
			28.4%	10.3%	27.2%	34.1%	100.0%
		University degree	34,571	16,485	19,958	31,361	102,375
			33.8%	16.1%	19.5%	30.6%	100.0%
	Total		79,287	37,203	64,377	98,488	279,355
			28.4%	13.3%	23.0%	35.3%	100.0%

Primary care by Mother's Education, First 3 cycles (early) or last 4 cycles (late)

Children up to Age 5, Official Minority Language Parents

Early (cycles 1-3) vs. Late (cycles 4-7)			Primary care, kindergarten excluded				Total
			Regulated	Unregulated non-relative	Unregulated relative	Parent/family only	
Early	Mother highest education, 4 categories	No post-secondary	2,007	4,032	2,166	7,865	16,070
			12.5%	25.1%	13.5%	48.9%	100.0%
		Some post-secondary	4,458	7,082	2,284	6,326	20,150
			22.1%	35.1%	11.3%	31.4%	100.0%
		College certificate or diploma	4,853	8,520	2,595	4,785	20,753
			23.4%	41.1%	12.5%	23.1%	100.0%
		University degree	6,596	8,171	2,525	7,853	25,145
			26.2%	32.5%	10.0%	31.2%	100.0%
	Total		17,914	27,805	9,570	26,829	82,118
			21.8%	33.9%	11.7%	32.7%	100.0%
Late	Mother highest education, 4 categories	No post-secondary	5,050	3,374	2,820	5,467	16,711
			30.2%	20.2%	16.9%	32.7%	100.0%
		Some post-secondary	3,300	2,121	1,656	2,992	10,069
			32.8%	21.1%	16.4%	29.7%	100.0%
		College certificate or diploma	7,310	3,478	3,087	5,373	19,248
			38.0%	18.1%	16.0%	27.9%	100.0%
		University degree	12,457	6,655	3,408	6,755	29,275
			42.6%	22.7%	11.6%	23.1%	100.0%
	Total		28,117	15,628	10,971	20,587	75,303
			37.3%	20.8%	14.6%	27.3%	100.0%

Weekly Child Care Expenditures by Mother's Education, NLSCY Cycle 7

Weekly child care expenditures by Mother's Education, Children of lone vs. couple parents, cycle 7

Child of lone parent?, cycle 7			Weekly child care expenditures all arrangements				Total
			$0	$1 to $50	$51 to $100	$101 and up	
No	Mother highest education, 4 categories	No post-secondary	22,131	38,658	25,085	28,205	114,079
			19.4%	33.9%	22.0%	24.7%	100.0%
		Some post-secondary	14,893	32,159	16,993	23,579	87,624
			17.0%	36.7%	19.4%	26.9%	100.0%
		College certificate or diploma	32,613	91,790	48,555	57,690	230,648
			14.1%	39.8%	21.1%	25.0%	100.0%
		University degree	39,377	93,896	64,366	131,218	328,857
			12.0%	28.6%	19.6%	39.9%	100.0%
	Total		109,014	256,503	154,999	240,692	761,208
			14.3%	33.7%	20.4%	31.6%	100.0%
Yes	Mother highest education, 4 categories	No post-secondary	15,051	10,497	6,210	8,494	40,252
			37.4%	26.1%	15.4%	21.1%	100.0%
		Some post-secondary	4,856	10,132	3,792	6,363	25,143
			19.3%	40.3%	15.1%	25.3%	100.0%
		College certificate or diploma	3,789	17,401	7,044	9,543	37,777
			10.0%	46.1%	18.6%	25.3%	100.0%
		University degree	1,355	4,160	5,618	7,412	18,545
			7.3%	22.4%	30.3%	40.0%	100.0%
	Total		25,051	42,190	22,664	31,812	121,717
			20.6%	34.7%	18.6%	26.1%	100.0%

Weekly child care expenditures by Mother's Education, Children of rural vs. urban parents, cycle 7

Child of rural parent?, cycle 7			Weekly child care expenditures all arrangements				Total
			$0	$1 to $50	$51 to $100	$101 and up	
No	Mother highest education, 4 categories	No post-secondary	32,366	42,684	26,935	32,506	134,491
			24.1%	31.7%	20.0%	24.2%	100.0%
		Some post-secondary	17,512	37,050	16,983	27,436	98,981
			17.7%	37.4%	17.2%	27.7%	100.0%
		College certificate or diploma	31,497	94,335	46,177	60,583	232,592
			13.5%	40.6%	19.9%	26.0%	100.0%
		University degree	38,286	88,942	62,170	132,690	322,088
			11.9%	27.6%	19.3%	41.2%	100.0%
	Total		119,661	263,011	152,265	253,215	788,152
			15.2%	33.4%	19.3%	32.1%	100.0%
Yes	Mother highest education, 4 categories	No post-secondary	4,816	6,471	4,360	4,193	19,840
			24.3%	32.6%	22.0%	21.1%	100.0%
		Some post-secondary	2,237	5,242	3,802	2,507	13,788
			16.2%	38.0%	27.6%	18.2%	100.0%
		College certificate or diploma	4,905	14,856	9,422	6,650	35,833
			13.7%	41.5%	26.3%	18.6%	100.0%
		University degree	2,447	9,114	7,813	5,941	25,315
			9.7%	36.0%	30.9%	23.5%	100.0%
	Total		14,405	35,683	25,397	19,291	94,776
			15.2%	37.6%	26.8%	20.4%	100.0%

Weekly child care expenditures by Mother's Education, Children of immigrant vs. non-immigrant parents, cycle 7

Child of one or both immigrant parents?, cycle 7			Weekly child care expenditures all arrangements				
			$0	$1 to $50	$51 to $100	$101 and up	Total
No	Mother highest education, 4 categories	No post-secondary	23,372	35,363	18,946	26,616	104,297
			22.4%	33.9%	18.2%	25.5%	100.0%
		Some post-secondary	14,573	35,554	16,190	23,085	89,402
			16.3%	39.8%	18.1%	25.8%	100.0%
		College certificate or diploma	24,244	91,293	44,570	50,204	210,311
			11.5%	43.4%	21.2%	23.9%	100.0%
		University degree	20,822	74,939	51,964	89,845	237,570
			8.8%	31.5%	21.9%	37.8%	100.0%
	Total		83,011	237,149	131,670	189,750	641,580
			12.9%	37.0%	20.5%	29.6%	100.0%
Yes	Mother highest education, 4 categories	No post-secondary	11,524	9,943	11,910	9,056	42,433
			27.2%	23.4%	28.1%	21.3%	100.0%
		Some post-secondary	3,638	5,780	4,131	5,538	19,087
			19.1%	30.3%	21.6%	29.0%	100.0%
		College certificate or diploma	10,933	16,743	8,539	15,448	51,663
			21.2%	32.4%	16.5%	29.9%	100.0%
		University degree	18,973	22,284	15,413	43,245	99,915
			19.0%	22.3%	15.4%	43.3%	100.0%
	Total		45,068	54,750	39,993	73,287	213,098
			21.1%	25.7%	18.8%	34.4%	100.0%

Weekly child care expenditures by Mother's Education, Children of official minority language vs. not official minority language parents, cycle 7

PMK, spouse or both first learned and still understands the minority official language, cycle 7			Weekly child care expenditures all arrangements				
			$0	$1 to $50	$51 to $100	$101 and up	Total
No	Mother highest education, 4 categories	No post-secondary	36,073	47,313	28,887	34,119	146,392
			24.6%	32.3%	19.7%	23.3%	100.0%
		Some post-secondary	19,172	38,139	19,059	28,066	104,436
			18.4%	36.5%	18.2%	26.9%	100.0%
		College certificate or diploma	33,375	100,990	51,032	63,158	248,555
			13.4%	40.6%	20.5%	25.4%	100.0%
		University degree	38,522	89,290	63,387	126,750	317,949
			12.1%	28.1%	19.9%	39.9%	100.0%
	Total		127,142	275,732	162,365	252,093	817,332
			15.6%	33.7%	19.9%	30.8%	100.0%
Yes	Mother highest education, 4 categories	No post-secondary	1,108	1,675	2,362	2,464	7,609
			14.6%	22.0%	31.0%	32.4%	100.0%
		Some post-secondary	558	2,846	1,725	1,687	6,816
			8.2%	41.8%	25.3%	24.8%	100.0%
		College certificate or diploma	3,027	8,087	4,567	3,531	19,212
			15.8%	42.1%	23.8%	18.4%	100.0%
		University degree	2,211	8,566	6,597	11,238	28,612
			7.7%	29.9%	23.1%	39.3%	100.0%
	Total		6,904	21,174	15,251	18,920	62,249
			11.1%	34.0%	24.5%	30.4%	100.0%

Weekly Child Care Expenditures by Quintiles of Mother's Income, NLSCY Cycle 7

Weekly Child Care Expenditures by Mother's Income (Quintiles), Children of lone vs. couple parents, cycle 7

Child of lone parent?, cycle 7			Weekly child care expenditures all arrangements				Total
			$0	$1 to $50	$51 to $100	$101 and up	
No	Mother's income, quintiles, cycle 7	$0 to $10,000	23,016	39,439	21,093	22,285	105,833
			21.7%	37.3%	19.9%	21.1%	100.0%
		$10,001 to $21,000	26,613	54,186	25,428	32,015	138,242
			19.3%	39.2%	18.4%	23.2%	100.0%
		$21,001 to $32,000	24,024	66,061	39,806	43,725	173,616
			13.8%	38.1%	22.9%	25.2%	100.0%
		$32,001 to $48,000	17,869	61,308	37,641	53,866	170,684
			10.5%	35.9%	22.1%	31.6%	100.0%
		$48,001 and up	18,726	41,148	32,785	92,922	185,581
			10.1%	22.2%	17.7%	50.1%	100.0%
	Total		110,248	262,142	156,753	244,813	773,956
			14.2%	33.9%	20.3%	31.6%	100.0%
Yes	Mother's income, quintiles, cycle 7	$0 to $10,000	10,398	10,261	7,644	7,289	35,592
			29.2%	28.8%	21.5%	20.5%	100.0%
		$10,001 to $21,000	8,399	14,079	5,210	5,960	33,648
			25.0%	41.8%	15.5%	17.7%	100.0%
		$21,001 to $32,000	2,582	9,271	3,960	5,476	21,289
			12.1%	43.5%	18.6%	25.7%	100.0%
		$32,001 to $48,000	2,656	6,632	5,872	6,713	21,873
			12.1%	30.3%	26.8%	30.7%	100.0%
		$48,001 and up	1,661	2,500	1,259	6,743	12,163
			13.7%	20.6%	10.4%	55.4%	100.0%
	Total		25,696	42,743	23,945	32,181	124,565
			20.6%	34.3%	19.2%	25.8%	100.0%

Weekly Child Care Expenditures by Mother's Income (Quintiles), Children of rural vs. urban parents, cycle 7

Child of rural parent?, cycle 7			Weekly child care expenditures all arrangements				Total
			$0	$1 to $50	$51 to $100	$101 and up	
No	Mother's income, quintiles, cycle 7	$0 to $10,000	27,385	41,794	25,212	27,165	121,556
			22.5%	34.4%	20.7%	22.3%	100.0%
		$10,001 to $21,000	30,808	59,502	24,682	34,385	149,377
			20.6%	39.8%	16.5%	23.0%	100.0%
		$21,001 to $32,000	23,819	64,829	36,376	43,744	168,768
			14.1%	38.4%	21.6%	25.9%	100.0%
		$32,001 to $48,000	19,654	60,850	38,696	56,875	176,075
			11.2%	34.6%	22.0%	32.3%	100.0%
		$48,001 and up	19,621	40,886	30,028	95,307	185,842
			10.6%	22.0%	16.2%	51.3%	100.0%
	Total		121,287	267,861	154,994	257,476	801,618
			15.1%	33.4%	19.3%	32.1%	100.0%
Yes	Mother's income, quintiles, cycle 7	$0 to $10,000	6,029	7,905	3,525	2,409	19,868
			30.3%	39.8%	17.7%	12.1%	100.0%
		$10,001 to $21,000	4,204	8,763	5,956	3,591	22,514
			18.7%	38.9%	26.5%	16.0%	100.0%
		$21,001 to $32,000	2,787	10,503	7,390	5,457	26,137
			10.7%	40.2%	28.3%	20.9%	100.0%
		$32,001 to $48,000	870	7,090	4,816	3,704	16,480
			5.3%	43.0%	29.2%	22.5%	100.0%
		$48,001 and up	765	2,762	4,016	4,359	11,902
			6.4%	23.2%	33.7%	36.6%	100.0%
	Total		14,655	37,023	25,703	19,520	96,901
			15.1%	38.2%	26.5%	20.1%	100.0%

Weekly Child Care Expenditures by Mother's Income (Quintiles), Children of immigrant vs. non-immigrant parents, cycle 7

Child of one or both immigrant parents?, cycle 7			Weekly child care expenditures all arrangements				
			$0	$1 to $50	$51 to $100	$101 and up	Total
No	Mother's income, quintiles, cycle 7	$0 to $10,000	23908	34768	15652	17740	92,068
			26.0%	37.8%	17.0%	19.3%	100.0%
		$10,001 to $21,000	23,034	54,028	24,017	23,582	124,661
			18.5%	43.3%	19.3%	18.9%	100.0%
		$21,001 to $32,000	17,409	61,050	32,782	34,368	145,609
			12.0%	41.9%	22.5%	23.6%	100.0%
		$32,001 to $48,000	11,520	60,168	34,212	44,870	150,770
			7.6%	39.9%	22.7%	29.8%	100.0%
		$48,001 and up	8,927	31,717	27,373	72,358	140,375
			6.4%	22.6%	19.5%	51.5%	100.0%
	Total		84,798	241,731	134,036	192,918	653,483
			13.0%	37.0%	20.5%	29.5%	100.0%
Yes	Mother's income, quintiles, cycle 7	$0 to $10,000	8,379	12,345	10,056	11,464	42,244
			19.8%	29.2%	23.8%	27.1%	100.0%
		$10,001 to $21,000	9,571	11,506	5,088	12,215	38,380
			24.9%	30.0%	13.3%	31.8%	100.0%
		$21,001 to $32,000	8,392	12,722	10,650	13,478	45,242
			18.5%	28.1%	23.5%	29.8%	100.0%
		$32,001 to $48,000	8,278	7,170	8,406	14,142	37,996
			21.8%	18.9%	22.1%	37.2%	100.0%
		$48,001 and up	10,514	11,632	6,401	23,309	51,856
			20.3%	22.4%	12.3%	44.9%	100.0%
	Total		45,134	55,375	40,601	74,608	215,718
			20.9%	25.7%	18.8%	34.6%	100.0%

(Official minority language parents vs. not official language minority parents: Suppressed due to one or more cells less than 5 observations)