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McMaster University

DEPARTMENT OF ECONOMICS

**CHILD HEALTH AND FAMILY SOCIOECONOMIC STATUS IN THE
CANADIAN NATIONAL LONGITUDINAL SURVEY OF CHILDREN AND YOUTH**

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I. Introduction

The primary goal of this paper is to improve our understanding of the link between the health of Canadian children and a variety of socioeconomic factors. Both researchers and policy makers have a long standing interest in this topic. There is broad agreement that environmental factors have an impact on health outcomes. Until recently, however, there has been little or no Canadian data with which to assess the nature and magnitude of the role which socioeconomic factors play in the incidence and severity of such problems.

The National Longitudinal Survey of Children and Youth (NLSCY) promises a major improvement in this situation. First, the sample is large; the first cycle of the NLSCY collected information on 22,831 children who were newborn to 11 years old in 1994-1995. Second, the information is comprehensive; the topics surveyed include child health, temperament, behaviour, school readiness/progress and other activities. Data were also collected on the child's custodial history, family functioning and the socioeconomic characteristics of the child's family and neighbourhood. Third, the survey is longitudinal; the long term goal is to conduct reinterviews every two years until the children are adults.

We have previously used data from the first release of the NLSCY to assess the association between a variety of psychiatric (hyperactivity, conduct disorder and emotional disorder), academic and social difficulties and a range of socioeconomic variables including the number, age, income, education and market work of parents, and the sex, number and age of children (Dooley, Curtis, Lipman and Feeny 1998).

Our work with the NLSCY data is continued in this paper. We use several additional measures of child health which were included in the second release of data from Cycle One of the

NLSCY earlier this year. These health measures, which we have also used with data from the Ontario Child Health Study (Curtis, Dooley, Lipman and Feeny 1998), derive from the Health Utilities Index Mark 2 (HUI2) system. The HUI2 system is comprised of seven attributes (sensation [vision, hearing and speech], mobility, self-care, emotion, pain, cognition, and fertility) with three to five levels of functioning per attribute. A multi-attribute utility function has also been estimated for the HUI2 system so that health status can be converted into a utility score reflecting health-related quality of life. We analyse both the categorical measures of health status and the health utility score which is a cardinal measure. In addition to new outcome measures, we also employ a broader range of conditioning variables than in our previous NLSCY paper. We consider detailed measures of child care arrangements, the market work patterns of both parents, neighbourhood characteristics and the self-reported health status of principal (adult) respondent to the NLSCY.

The paper is divided into five sections. Section II provides a brief review of the literature. Section III describes the NLSCY data and the Health Utilities Index Mark 2 system. The descriptive statistics and the results of our multivariate analysis are in Section IV. Section V is a summary and conclusion.

II. Previous Literature

This literature review will focus on two of our previous studies. In Dooley, Curtis, Lipman and Feeny (1998), we used data from the first Cycle of the NLSCY to analyse the relationship of child psychiatric disorders, poor school performance and social problems with low income, family structure and other socioeconomic variables. The primary NLSCY respondent is the household

member, usually the mother, who is most knowledgeable about the child (PMK = person most knowledgeable). The psychiatric disorders were hyperactivity, conduct disorder and emotional disorder. Our two measures of academic performance were whether or not the child had ever repeated a grade and whether or not the child was reported as doing “poorly” or “very poorly” in school. A social problem was deemed present if the PMK reported the child as having “frequent” or “constant” problems in getting along with other children, teachers or parents. The prevalence of any one individual problem among the children in our sample was at most 10%. Twenty-three per cent of the children had one (or more) of any of these problems.

Our multivariate (logit) estimates provided a number of interesting and not always expected conclusions. The effect of low income was quite sensitive to the income measure used and to sample weights. With weighted data and the Statistics Canada (1992) Low Income Cutoff as a poverty line, our low-income coefficients were significant only for repeated a grade and frequent social problems. With either unweighted data or of a dummy variable for family income under \$20,000 (controlling for family size) , we found a strong association between low income and every outcome measure except hyperactivity.

Lone-mother status was strongly associated with virtually all of our (poor) outcomes. The coefficient estimates for this variable were both robust and imply sizable quantitative effects on the predicted probability of a disorder or problem. Interpretation of this finding, however, is not straightforward. It may be that many or most of the problems observed in the children of lone mothers have resulted from the dysfunctional nature of the two-parent family in which those children once lived. Exiting from such two-parent families may have had a beneficial impact on the health and development of the children in question rather than the negative effect which might be inferred

from a simplistic reading of our estimates based on a single cross-section. Other interpretations of the “lone-mother effect” include the above-average length of low-income spells among lone-mother families; the lack of non-monetary assistance from family, friends and social service agencies; and the emotional trauma induced by marital disruption.

We also usually found a higher incidence of problems among boys, children with a PMK who did not complete secondary school and children with a PMK under age 35. We did not find a consistent relationship between child outcomes and the PMK’s participation in either “full-year, full-time” or “part-year or part-time” market work.

The best Canadian child-health data prior to the NLSCY, and still the only currently available longitudinal data, come from the Ontario Child Health Study (OCHS). The initial OCHS survey was administered in 1983 (Offord, Boyle, Szatmari et al., 1987) with a Follow-up in 1987 (Offord, Boyle, Racine, et al., 1992). The main objective was to estimate the prevalence of child psychiatric disorders. Data were also collected on the physical health, social and educational functioning of the child, and on a variety of socioeconomic status variables. The principal respondent was the parent (usually the mother) for an initial random sample of 3,294 children age 4 to 16 in 1983.

Curtis, Dooley, Lipman and Feeny (1998) measured health outcomes in the OCHS using the Health Utilities Index Mark 2 (HUI2) that has been widely used to assess the health status of children (Feeny et al. 1992). The HUI2 has two components. The first is a categorical health status classification system based on seven attributes: sensation (vision, hearing, and speech), mobility, emotion, cognition, self-care, pain and fertility. The second component is a multi-attribute utility function that translates categorical health status information into cardinal scores on the conventional

scale of perfect health equals 1.00 and death equals 0.00 (Torrance et al. 1995, 1996). See Section III for more details.

The majority of children in the OCHS are very healthy as measured by the HUI2 system. Approximately half of the sample have no problems in each of 1983 or 1987. The individual attributes of most interest in the study were emotion and cognition. Well over fifty percent report no emotional problems and almost 90% report no cognitive problems at any point in the sample. The good health of Ontario's children is also reflected in the distribution of HUI2 scores which has a mean for the two years of 0.93 and a 10th percentile of 0.80. Simple cross tabulations did reveal, however, that children of lone mothers and from low-income families are clearly at greater risk of poor health as judged by differences in the distribution of children without problems and by differences in the mean and lower percentiles of the utility score distribution.

A variety of multivariate approaches to the data were employed including the following: logit functions for the probability of any impairment and the individual impairments of emotion and cognition; a tobit function for the expected value of the health utility score; and quantile regressions for the 20th and 10th percentiles (the "lower percentiles"). We estimated models of 1983 outcomes, 1987 outcomes and joint or average outcome measures. We also constructed independent variables that allowed us to investigate long term effects of lone motherhood and poverty.

The longitudinal results indicate that lone motherhood (both current and long-term status) was negatively associated with all outcome measures except cognition. Most notable was the fact that current low income exhibited a much weaker relationship with our health outcome measures than did longer term low income. In most cases the marginal effect on child health of long term poverty was equal to or greater than the marginal effect of ever having lived in a lone-mother family.

As with NLSCY data, health deficits were also usually more strongly associated with boys, younger mothers and mothers with less than a secondary school degree.

III. Data and Estimation Methods

A. Sample Selection

There are 14,226 children age 4 to 11 in the NLSCY. From this number, we omitted the following: 8 children who do not live with either parent (biological, step, adopted or foster), 29 children for whom neither parent is the PMK, 195 children who live with a lone father, 1,887 children for whom there were missing values for any of the variables in our study. These omissions resulted in a sample of 12,107 children age 4 to 11. We excluded the children who do not live with either parent or for whom neither parent is the PMK on the grounds that these may represent quite unusual and/or temporary family structures. The children of lone fathers were excluded because their number is too small for separate analysis and their socioeconomic characteristics, especially income levels, are too dissimilar from those of lone mothers to justify a common category of “lone parents”.

B. Outcome Measures

The Health Utilities Index Mark 2 (HUI2), as indicated in Section II, is based on the attributes of sensation (vision, hearing, and speech), mobility, emotion, cognition¹, self-care, pain and fertility. There are three to five levels per attribute in HUI2. Attribute levels range from level 1 (normal for age) to severely impaired (lowest level for that attribute). For instance, level 1 for cognition is "learns and remembers school work normally for age" and level 4 (the lowest) is "unable to learn and remember". The levels for each of the attributes are described in Table 1. The health status of a person at a point in time is described as a seven-element vector with one level per attribute. The NLSCY contains no information on the fertility status of the children and a value of 1 was assigned for this attribute.

The valuation of health status, as described in HUI2, is based on preference measurements obtained from a random sample of 194 parents of general public school-aged children in Hamilton, Ontario. Parents were asked to value a number of health states on a visual analog scale and with the standard gamble (based on von Neumann-Morgenstern utility theory). The calculation of the utility score is relatively complex. The last column and final row of Table 1 present a simplified formula for calculating the utility scores. The multiplicative form of the utility function captures simple interactions in preferences among attributes. (The more simple additive utility function was rejected by the data.)

The HUI2 was developed for and initially applied to the assessment of the health status of survivors of cancer in childhood. HUI2 was therefore designed to capture a wide range of health problems with varying levels of severity of impairment. HUI2 was specifically designed to distinguish mild, moderate and severe levels of impairment within each of its seven attributes. Therefore the description of levels were chosen so that they ranged from highly impaired to normal.

Supra-normal capacity (for instance above normal physical fitness or emotional resilience) were not included in HUI2. Because HUI2 was focussed on distinguishing “normal” children from those with health problems rather than distinguishing sub-groups of “normal” children, it is possible that its ability to distinguish levels of health among “normal” children may be attenuated (possible ceiling effect). This may contribute to the high percentage of subjects who were classified as experiencing perfect health (no impairments).

The NLSCY survey questions, which were asked of the PMK in order to capture the child’s health related quality of life, are actually based on the more recently developed, eight-attribute, Health Utilities Index Mark 3 system (HUI3). To date, however, there is no validated scoring function for the HUI3. Therefore, Statistic Canada has mapped the responses to the HUI3 questions into the HUI2 system and included the resulting scores on the public release file.

Our goal is to analyse not only the continuous HUI2 score but also the categorical indicators of health impairments as we did in our OCHS paper (Curtis et al. 1998). The NLSCY public release file suppresses the responses to many items for reasons for confidentiality. However, we do have sufficient information to classify each child as having (or not) a health impairment of any type and as having (or not) an impairment in the categories of emotion, cognition and pain. In the OCHS data, these were the attributes with the highest prevalence rates and that also appears to be the case with the NLSCY. Indeed, the main reason for suppressing responses concerning the other attributes is that very low prevalence rates compromise confidentiality. We also find with the NLSCY data, as we did with the OCHS, that emotional and cognitive impairments are most strongly related to socioeconomic factors and we focus those outcomes below.

The NLSCY do contain one additional indicator of overall child health that does not form part of the HUI system and on which we report briefly in the next section. This is the PMK's assessment of the child's overall health as excellent, very good, good, fair or poor.

C. Family and Individual Characteristics

We classified a family as a lone-mother family if the child was living with a mother who had no spouse or common-law partner living in the household. The comparison group is a two-parent family where "parent" refers to a biological, step, adoptive or foster parent. Ninety-eight percent of Canadian children live in one of these two types of families.

Our principal income variable is a conventional measure of low income or poverty. Specifically, we classified a family as low income or poor if the family income level is below the 1992 Statistics Canada Low Income Cut-off (LICO). We have focussed on poverty as opposed to other measures of income for several reasons. One is that previous Canadian studies have often found a non-linear relationship between family income and child health. The association is strongest at low levels of income. A second reason is that much recent discussion concerning child policy has centred on income-targeted proposals, such as an enriched federal child benefit, which have the principal goal of reducing the incidence of poverty among families with children. We wish to explore the possible health consequences of such proposals. The third and most binding reason is that the income data available in the NLSCY public use file are very limited. Most importantly, the continuous measure of family income, the family LICO and the ratio of these two figures are all suppressed on the public use file.

We also as yet have only one year of income data. Hence, our low-income measures fail to distinguish between short and long spells of poverty which may have quite different consequences for child health and development. The absence of such information may affect the estimated coefficients of variables other than low-income status as we found with the OCHS data in Curtis et al. (1998). In particular, we suspect that at least part of the estimated impact of lone motherhood is really a permanent income effect, that is, it reflects the fact that lone mothers have much longer spells of poverty than do couples (Laroche 1997). The same may be true of other variables in our multivariate analysis such as parental education. More insight into this matter will be provided by future cycles of the NLSCY data.

Numerous other variables are also used in our multivariate analyses. These include the age and sex of the child, the number of children in the family, the age and schooling of the PMK, and the province of residence. The work patterns of the parents are also of interest to us. In some specifications, we estimated models which included dummy variables for all possible combinations of full-time, part-time and no market on the part of both parents (if there are two). This yielded very few coefficients which were significantly different from zero using conventional thresholds. In the tables below, we report on a simpler specification with just two dummy variables for full-time or part-time market work by the mother.

We also controlled for variation in child care arrangements. In the tables below, we used the following dummy variables for the “primary child care arrangement which was used to allow the PMK and spouse to work or study”: in the family’s home (but not by PMK or spouse), in another home, in a day care centre, or some other arrangement. We also used a continuous variable for the weekly number of hours the child spent in this primary arrangement. A more detailed classification

of types of childcare (for example, care by a relative or a non-relative) was available but a more extensive set of dummy variables than that shown in the following tables did not yield additional insights into the correlates of child health.

One other set of variables of interest to us are neighbourhood or “social capital” variables. One such variable available in the NLSCY is the number of years which the PMK has lived at her or his current address. Three others are summary measures of how “safe”, “problematic” and “cohesive” the neighbourhood was judged to be by the PMK. The neighbourhood safety score varies from 0 to 6 and summarizes how the PMK responded to a characterization of the neighbourhood as “safe to walk alone after dark” and “safe for children to play outside during the day”. The possible responses were 3 = strongly agree, 2 = agree, 1 = disagree and 0 = strongly disagree. The summary measure of neighbourhood cohesion varies from 0 to 15 and indicates how the PMK responded (using the same response options as for safety) to five questions concerning “neighbours’ willingness to deal with problems”, “neighbours that children can look up to”, “people’s willingness to help their neighbours”, “neighbours who watch out for other children” and “neighbours who keep their eyes open for possible trouble”. The neighbourhood problems score varies from 0 to 10 and indicates how the PMK rated the neighbourhood’s problems concerning “garbage or litter”, “drug use or sales”, “alcoholics and excessive public drinking”, “groups of young troublemakers” and “burglary of homes or apartments”. The possible responses were 2 = big problem, 1 = somewhat of a problem and 0 = no problem.

A final set of variables which we considered are dummy variables for the PMK’s assessment of her or his own health as excellent, very good, good, fair or poor. Our desire is to control for the health endowment of the children. However, this independent variable is clearly endogenous to the

extent that parental health is determined by the same factors as child health. We present our multivariate model estimates both with and without the measures of parental health.

This last set of variables is, of course, not the only potential source of endogeneity. We implicitly assume in our multivariate analyses that child health and schooling are the outcomes of socioeconomic factors such as income and family structure. It certainly possible, however, that the opposite causal effect may be true in some cases. For example, severe childhood health problems may reduce family income by limiting the paid work of one or both parents. The stress arising from severe health problems might also influence the likelihood of separation, divorce or remarriage. Unfortunately, there is little that can be done about this problem currently given the lack of identifying variables for a more complete structural model. Our approach is best viewed as one means of exploring the joint distribution of the variables which we believe to be of relevance to the process which determines child health and development.

IV. Empirical Results

A. Summary Measures

Table 2 provides summary measures of children's health status for the sample as a whole and by low income and family status. Two-thirds of the children in the sample have no health impairments as measured by the HUI system but this is true of only a slight majority of the children of poor lone-mothers. The difference in the incidence of any health impairment by low income

status is 7-8 percentage points for both two-parent and lone-mother families. Similarly, the difference is 8-9 percentage points by family status for both poor and non poor families.

The proportion of children in the total sample who have no emotional problems and no cognitive problems are 90% and 79% respectively. This is the reverse of the OCHS sample in which 92% of the children had no cognitive impairment and 72% had no emotional impairment. This may reflect differences in sample size and between Ontario and the country as a whole. However, there also were changes in the wording of the questions from HUI2 to HUI3 which likely play an important role. There are also noticeable NLSCY differences in the proportion of children with either an emotional or a cognitive impairment by both family and low income status. However, the magnitudes of these differences are a bit smaller than was the case in the first row for no health problems. The utility scores indicate a very healthy population. The mean score for children 0.97 and the 20th and 10th percentiles are 0.94 and 0.90 respectively. In this case, the differences by family status and low-income status are only noticeable (more than one percentage point) when considering the 10th percentile. The PMK's also rated their children as quite healthy when asked a summary question as indicated by the bottom rows of Table 2. The percentage of children with excellent or very good health was 88%. Only 3% of children were rated as having fair or poor health. The difference in the proportion of children rated as in "excellent health" was 7-8 percentage points by low income status for both two-parent and lone-mother families. However, the same difference is only 1-2 percentage points by family status for both poor and non-poor families. No more than 5% of children from any type of family are rated as in fair or poor health. If one combines the bottom three categories (good, fair and poor), then the children of poor lone-mothers stand out with 22% in these classifications as opposed to no more than 12% of children from other types of

families. The correlation between our two summary measures of child health, the HUI2 score and the PMK's classification of the child's overall health status, was only 0.24.

Table 3 provides the family and individual characteristics of the children by family and low-income status. Fourteen per cent of all children have a lone mother. This proportion is only 6% among non-poor families and rises to 39% among the poor. Twenty-five percent of all children in our sample come from low income families but this is true of over two-thirds (69%) of the children of lone mothers. The total sample is evenly divided between children age 4-7 and those age 8-11, but the children of non-poor families are slightly older than poor children. The number of children in the family is slightly larger in poor families and in two-parent families. Only 8% of the children in our sample have a male PMK. This variable turned out to be very poorly correlated with child health and was not included in the multivariate specifications on which we report in the following tables.

Very few children in our sample have a PMK under age 25 and a majority have a PMK over age 34. The age of the PMK's spouse is suppressed in the NLSCY public release file. Hence, we can only use age of PMK as opposed to the age of mother. The education and market work of the PMK's spouse were not suppressed and, hence, we could identify the schooling and market work of the mother and father in all two-parent families. This turned out to make little difference empirically, in part because so few PMK's are the father.

Low-income mothers are more likely to lack a high school degree and less likely to have a diploma or degree from college or university regardless of family status. The same is not necessarily true of differences by family type conditional on income. For example, non-poor lone mothers are

less likely to lack a high school degree and more likely to have a diploma or degree from college or university than are non-poor married mothers.

Seventy percent of the children in our sample were in no “primary child care arrangement which was used to allow the PMK and spouse to work or study”. The use of such a child care arrangement was more common among non-poor families of either family type and among lone mother families of either income type. The relative ranking of child care arrangements was the same for all types of families in Table 3. The most common arrangement was “care in another home” followed by “care in the child’s own home”, “centre care” and “other”. Mean weekly hours of child care were clearly highest among non-poor lone mothers. This was not true, however, of mean weekly hours of child care among those with positive hours. Forty per cent of mothers work full-time in the market. This proportion is much larger among non-poor mothers than among poor ones and particularly among non-poor lone mothers. Just less than one-quarter of mothers work part-time in the market.

The average PMK has lived at the current address for 6.2 years and the figure is higher among the non-poor than among the poor, and higher among couples than among lone mothers. The mean neighbourhood safety score is 4.3 out of a possible 6 which implies that the average PMK “agrees” but does not “strongly agree” that the neighbourhood is “safe to walk alone after dark” and “safe for children to play outside during the day”. The mean neighbourhood problem score is 1.3 out of a possible 10 which implies that the average PMK sees few neighbourhood problems such as garbage or burglary. The mean neighbourhood cohesion score is 10.8 out of a possible 15 implies that the average PMK “agrees” but does not “strongly agree” that the neighbours are people who “are willing to help their neighbours”, “watch out for others”, etc. With respect to the last three of these

measures, poor PMK's, not surprisingly, rate their neighbourhoods as worse than non-poor PMK's, but the differences are usually less than 10 percentage points at the mean. In addition, there do not appear to be systematic neighbourhood response differences between married PMK's and lone mothers conditional on low-income status.

The final panel of Table 3 indicates the self-reported health status of the PMK's. The PMK's do not rate their own condition quite as favorably as that of the children, which is not surprising given the age differences, but they believe themselves to be a healthy group nonetheless. The biggest differences come in the top category. Only 36% of PMK's rate their own health as excellent whereas 60% of children were given this classification. Differences at the bottom end were smaller. Only 10% or less of the PMK's are in fair or poor health regardless of family status and low-income status as opposed to 5% or less of the children. As with the children, conditional differences in the PMK's health status by low-income status appear more pronounced than are differences by family-status.

B. Multivariate Results

The results of our multivariate analyses are presented in Tables 4 through 8. In Table 4 through 6, we report estimates of logit models for the likelihood of “no health problem”, “no emotional health problem” and “no cognitive health problem”. The estimates of a tobit model using the HUI2 score are in Table 7. Table 8 contains quantile regression estimates for the 10th percentile of the HUI2 score. Several preliminary comments are in order.

First, we do not report the estimates of several conditioning variables with which we experimented and which persistently yielded very large p-values. These include dummy variables for a PMK under age 25 and a male PMK (in two-parent families), an interaction term for lone-mother status and low-income status, and interactions between the sex of the child and other conditioning variables. With respect to this last finding, we have found in all of our work that girls have consistently fewer health problem in this age group than boys. (This changes in adolescence at least in the case of emotional problems.) This effect, however, can be adequately represented by a simple dummy variable.

Second, the 12,115 children in our sample come from fewer than 6,000 different families. In order to adjust the standard error estimates for this fact, we employed a method developed by White (1980) for the logit estimates. This option was unavailable in our software for the tobits and quantile regressions. In the logits, however, this adjustment typically did not make a large difference.

Third, we had to decide whether or not to use the sample weights in our multivariate analyses. In the economics literature, this issue receives relatively little attention because it is commonly found, or at least assumed, that weighting makes little difference. We adapted a test suggested by DuMouchel and Duncan (1983) in the context of linear regression. Each model was estimated including an interaction between each independent variable and the sample weight. We then tested the hypothesis that the interaction terms were jointly equal to zero. We were able to reject the hypothesis with a p-value of at least 0.05 in the cases of logit model for cognitive disorder and the tobit function for the HUI2 score. The same hypothesis could not be rejected in the other three models: the logits for no health problem and no emotional health problem, and the quantile

regressions for the HUI2 score. In the tables below, we present the estimates with weighted data and comment in the text on the impact (generally quite small) of using unweighted data at the end of the section.

Finally, all the estimates in Tables 4 through 8 come from models which included a dummy variable for each province. We have omitted these coefficients in order to save space, but we do comment on these results at the end of this section.

Table 4 presents two sets of logit estimates for no health impairment (HUI2 score = 1.0). The model reported in columns (2) through (4) does not contain dummy variables for the PMK's health self-reported health status and the model reported in columns (5) through (7) does. Entries in the column labelled "Marg Effects" show the impact on the expected value of the dependent variable at the sample proportion (0.66). The omitted category is a 4-7 year-old son of a non-poor, married mother who is age <35, has a secondary education and is in good health, does not work in the market and does not use child care so as to be able to work or study. The marginal effects reflect the impact of a change in a dummy variable or a one unit change in a continuous variable.

We begin with the entries in columns (2) - (4). Both lone-mother and low-income status have significant (p-values < 0.5) and sizable effects (seven and four percentage points respectively) on the likelihood of "perfect health". Consistent with most previous findings, younger children and girls are much less likely to have a health impairment. The only effect of schooling is that children of mothers without a secondary degree are more likely to have a problem. None of the coefficients for child care or market work are significant at conventional threshold levels and, as mentioned above, we found a similar situation when we also controlled for the nature of the child care-giver (relative or non-relative) and the father's market work (in two-parent families). Three of four neighbourhood

variables perform as expected. Each year at the current address is associated with another one percentage point in the probability of perfect health. Fewer child health problems are also significantly associated with less problematic and more cohesive neighbourhoods.

The final three columns of Table 4 indicate that parental and child health are strongly correlated in that the children of PMK's with excellent and very good health are 11 and 6 percentage points respectively more likely to have no impairments. The addition of PMK health status has relatively little effect on the other estimates other than that of raising the p-values of the low-income and neighbourhood cohesion variables.

Table 5 presents the logit estimates for no emotional problems. These are similar to those for no health impairment with the following exceptions. The coefficients for low-income, mother lacking a high school degree and years at current address do not have significant effects. In addition, child care in "another home" is now weakly (p -value = 0.05) associated with a lower likelihood of no impairment.

Table 6 presents the logit estimates for no cognitive problems. The results are generally similar to those for no health impairment in Table 4 with the following exceptions. Lone-mother and PMK lacking a high school degree do not have significant effects. Our study (Curtis et al. 1998) with the OCHS data showed the same pattern as Table 5 and 6 in that lone motherhood was more strongly associated with emotional problems than was low income and the reverse was true for cognitive impairments. Finally, Table 6 presents the only evidence in this study of a link between market work and child health. Both full-time and part-time market work are associated with a lower likelihood (3-4 percentage points) of no cognitive health impairment.

Tables 7 and 8 present the results for the HUI2 score. The tobit estimates for the expected value of the utility score in Table 7 are qualitatively very similar to those for the probability of perfect health in Table 4. The variables with significant effects are lone mother, low income, sex and age of child, mother lacking a high school degree, years at current address, neighbourhood problems and cohesion, and PMK with excellent or very good health status. The marginal effects are quite small, for example, the conditional difference between poor and non-poor children in the expected value of the HUI2 score is less than one percentage point. This is consistent, however, with the very high mean and low dispersion of this variable.

Table 8 contains the quantile regression estimates for the 10th percentile. These are unweighted estimates because our software does not have a weighted option for this procedure. The estimates for the 20th percentile are quite similar, the major difference being that the coefficient for mother's education less than a HS degree has a lower p-value (.02). The 10th percentile estimates in Table 8 are quite similar to those for the tobit function with a few exceptions. In Table 8, the age of the PMK is positively associated with the child's health. This was a common finding in our previous papers but this is the first indication of such an association in this study. There is little support for a link between the mother's education and child health in Table 8. The weekly number of hours in child care has a low p-value but also an extremely small coefficient.

We estimated each of the models in Table 4 through 7 using unweighted data. Differences between the weighted and unweighted estimates were few. In particular, we did not find that this had a major impact on the low income coefficients as we did in Dooley et al. (1998). The major change is that the coefficient for PMK over age 34 is significantly negative in each multivariate analysis with unweighted data. This result is consistent with our previous findings from the OCHS

and the NLSCY, and could represent a variety of factors including the greater income or parenting experience of older PMK's. Two other differences are that the coefficients for mothers with less than a secondary degree were significant in all multivariate analyses using unweighted data.

Only two provinces had a consistent pattern of (conditional) differences from Ontario (the omitted category). Both Quebec and Saskatchewan had significantly negative coefficients in each of Tables 4 through 8 save for Quebec in the case of cognitive problems. There were only isolated significant coefficients for the other provinces.

V. Summary and Conclusion

Our general objective has been to improve our understanding of the relationship between family socioeconomic status and child health. Our specific goal has been to use health indicators from the Health Utilities Index Mark 2 (HUI2) system which were provided in the second release from Cycle One of the National Longitudinal Survey of Children and Youth. We analyse both categorical measures for specific attributes (emotion and cognition) and the health utility score, a cardinal measure which summarizes data from seven attributes. The conditioning variables on which we focus include the following: the number, age, income, education, health status and market work of the parents; the sex, number and age of the children; child care arrangements; and neighbourhood characteristics.

Most Canadian children are very healthy as measured by the HUI2 system. Two-thirds of the sample have no problems. Ninety percent report no emotional problems and 79% report no cognitive problems. The utility scores also indicate a very healthy population. The mean score for children

is 0.97, and the 20th and 10th percentiles are 0.94 and 0.90 respectively. Simple cross tabulations did reveal, however, that children of lone mothers and from low-income families are at greater risk of poor health.

We employed several multivariate approaches to the data. Logit functions were estimated for the probability of any health impairment and for the individual impairments of emotion and cognition. For the HUI2 score, a tobit function was estimated for the expected value and quantile regressions were estimated for the 20th and 10th percentiles. As in our past work with other outcome measures, we usually find that child health is generally stronger among younger girls from non-poor families with two parents and a mother who had at least a high school degree.

Several new variables were introduced into our analysis. A measure of neighbourhood cohesion (problems) usually had positive (negative) correlation with child health. The self-reported health status of the PMK was also empirically linked to child health but the endogeneity of this factor may be particularly strong. We experimented with a variety of specifications for child care arrangements and the market work patterns of both spouses. The only link supported by the data consisted of the negative coefficients for full-time and part-time market work by the mother in the logit function for no cognitive health problems. Weighting generally had little impact on our findings. One exception was that the age of PMK was significantly and positively correlated with child health in the unweighted data only. Dummy coefficients were estimated for each province, but the negative coefficients for Quebec and Saskatchewan were the only persistent findings.

The evidence reviewed above and data from other studies establishes a clear statistical link between child health and low-income, family structure and other socioeconomic characteristics. Several additional steps should and will be taken with the data. One is to explore the role of the

market work and child care variables within subsets of the sample such as the children of lone mothers and poor parents. A second is to draw more heavily on the family and child custody history now available via remote access in order to make additional distinctions between various family types. A third is to consider measures of income other than the simple low-income dummy considered here.

Very few if any specific policy recommendations, however, can be drawn from the currently available data. It is simply too difficult to infer at present what is the actual effect of specific variables on child outcomes and how such evidence can be translated into policy prescriptions. This is as true for cash-transfer programs as for in-kind services.

What might the future hold by way of stronger conclusions? The NLSCY provides promising opportunities in this regard. We will have the capacity to distinguish clearly between families which are briefly poor and families which are permanently poor. We will also be able to observe the same children move into and out of different family structures which will provide a much more direct look at the health changes associated with such family transitions. The resulting family history will also help to identify which lone parent families have resulted from the dissolution of abusive unions.

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Endnotes

1 . The underlying concept for the attribute cognition in the HUI2 is intellectual capacity with respect to memory, thinking and problem solving. The focus is on capacity. However, the description of the levels for cognition may be interpreted as performance based. The questions in the OCHS are geared towards problems in learning and performance in school performance indicators. We should probably refer to the measure for cognition as “cognitive impairments or learning and schooling problems.” We will, however continue to use the term cognition now that the reader is advised of the probable misalignment of the meanings.

Table 1
HEALTH UTILITIES INDEX MARK 2 (HUI2)

ATTRIBUTE	LEVEL	DESCRIPTION ¹	b ²
SENSATION	1	Ability to see, hear and speak normally for age.	1.00
	2	Requires equipment to see or hear or speak.	0.95
	3	Sees, hears, or speaks with limitations even with equipment.	0.86
	4	Blind, deaf or mute.	0.61
MOBILITY	1	Able to walk, bend, lift, jump, and run normally for age.	1.00
	2	Walks, bends, lifts, jumps, or runs with some limitations but does not require help.	0.97
	3	Requires mechanical equipment (such as canes, crutches, braces or wheelchair) to walk or get around independently.	0.84
	4	Requires the help of another person to walk or get around and requires mechanical equipment as well.	0.73
	5	Unable to control or use arms and legs.	0.58
EMOTION	1	Generally happy and free from worry.	1.00
	2	Occasionally fretful, angry, irritable, anxious, depressed or suffering night terrors.	0.93
	3	Often fretful, angry, irritable, anxious, depressed or night terrors.	0.81
	4	Almost always fretful, angry, irritable, anxious, depressed.	0.70
	5	Extremely fretful, angry, irritable or depressed usually requiring hospitalization or psychiatric institutional care.	0.53
COGNITION	1	Learns and remembers school work normally for age.	1.00
	2	Learns and remembers school work more slowly than classmates as judged by parents and/or teachers.	0.95
	3	Learns and remembers very slowly and usually requires special educational assistance.	0.88
	4	Unable to learn and remember.	0.65
SELF CARE	1	Eats, bathes, dresses, and uses the toilet normally for age.	1.00
	2	Eats, bathes, dresses, or uses the toilet independently with difficulty.	0.97
	3	Requires mechanical equipment to eat, bathe, dress, or use the toilet independently.	0.91
	4	Requires the help of another person to eat, bathe, dress or use toilet.	0.80
PAIN	1	Free of pain and discomfort.	1.00
	2	Occasional pain. Discomfort relieved by non-prescription drugs or self-control activity without disruption of normal activities.	0.97
	3	Frequent pain. Discomfort relieved by oral medicines with occasional disruption of normal activities.	0.85
	4	Frequent pain; frequent disruption of normal activities, discomfort requires prescription narcotics for relief.	0.64
	5	Severe pain. Pain not relieved by drugs and constantly disrupts normal activities.	0.38
FERTILITY	1	Able to have children with a fertile spouse.	1.00
	2	Difficulty having children with a fertile spouse.	0.97
	3	Unable to have children with a fertile spouse.	0.88

Formula $u^* = 1.06 (b_1 * b_2 * b_3 * b_4 * b_5 * b_6 * b_7) - 0.06^2$
where u^* is the utility of the health state on a utility scale of 0.00 (dead) to 1.00 (healthy)

¹Source: Torrance et. al. 1996, p. 706.

²Source: Torrance et. al. 1996, p. 716.

Table 2
Health Status of Children by Family Status and Low-Income Status

	Total	Non-Poor Two-Parent	Poor Two-Parent	Non-Poor Lone-Mother	Poor Lone-Mother
No Health Problems	66%	69%	62%	61%	53%
No Emotional Problems	90%	92%	88%	85%	83%
No Cognitive Problems	79%	81%	77%	77%	73%
Mean Utility Score	.97	.97	.96	.96	.95
Utility Score - 20 th Percentile	.94	.94	.93	.93	.92
Utility Score - 10 th Percentile	.90	.93	.88	.88	.85
% of Children With Excellent Health	60%	62%	55%	61%	53%
% of Children With Very Good Health	28%	28%	33%	27%	25%
% of Children With Good Health	10%	9%	11%	10%	18%
% of Children With Fair Health	2%	1%	2%	1%	3%
% of Children With Poor Health	1%	0%	0%	1%	1%
Number of Observations	12,115	10,539	1,576	8,981	3,134

Table 3**Family and Individual Characteristics by Family Status and Low-Income Status**

	Total	Non-Poor Two-Parent	Poor Two-Parent	Non-Poor Lone- Mother	Poor Lone-Mother
% Lone Mother	14%	6% of Non-Poor are Lone-Mother		39% of Poor are Lone-Mother	
% Low Income	25%	18% of Two-Parent are Poor		69% of Lone-Mother are Poor	
% Children Age 8-11	50%	51%	47%	56%	43%
Mean Number of Children	2.4	2.4	2.7	1.9	2.1
% Girl	49%	49%	49%	60%	48%
% PMK - Father	8%	10%	8%	--	--
% PMK < 25	1%	1%	2%	1%	5%
% PMK > 34	58%	63%	47%	64%	39%
<u>Mother's Education</u>					
% Mother < HS Degree	16%	11%	32%	5%	29%
% Mother - HS Degree	19%	19%	20%	13%	19%
% Mother - Some Post HS	29%	28%	28%	34%	35%
% Mother - Coll/Univ Degree	36%	42%	20%	48%	17%
<u>Child Care</u>					
% Child Care in Other Home	16%	18%	7%	26%	11%
% Child Care in Own Home	8%	9%	3%	9%	5%
% Child Care in Centre	4%	4%	2%	11%	4%
% Other Child Care	2%	2%	1%	3%	4%
% Not in Child Care	70%	67%	87%	51%	76%
Mean Hours in Child Care	4.7	5.0	1.8	9.4	4.7
Mean Hours in Child Care (>0)	15.7	15.2	14.6	18.9	19.1
<u>Mother's Market Work</u>					
% Mother Works Full-Time	40%	46%	16%	85%	19%
% Mother Works Part-Time	23%	25%	19%	5%	15%

Table 3 (continued)

Family and Individual Characteristics by Family Status and Low-Income Status

	Total	Non-Poor Two-Parent	Poor Two-Parent	Non-Poor Lone- Mother	Poor Lone-Mother
<u>Neighbourhood</u>					
Mean Years at Current Address	6.2	6.8	5.9	4.8	3.4
Neighbourhood Safety (0-6)*	4.3	4.3	4.1	4.5	3.8
Neighbourhood Problems (0-10)**	1.3	1.2	1.5	1.1	2.0
Neighbourhood Cohesion (0-15)*	10.8	11.1	10.3	10.5	9.3
<u>PMK's Health Status</u>					
% PMK's Health - Excellent	36%	39%	28%	33%	25%
% PMK's Health - Very Good	39%	40%	36%	46%	34%
% PMK's Health - Good	21%	18%	27%	18%	32%
% PMK's Health - Fair	4%	2%	7%	3%	8%
% PMK's Health - Poor	1%	1%	2%	0%	2%
Number of Observations: 12,107; *higher is safer or more cohesive; **higher is more problematic					

Table 4
Logit Estimates of No Health Problems

	Coefficient	P - value	Marg Effect	Coefficient	P - value	Marg Effect
Lone Mother	-.31	.00	-.07	-.30	.01	-.07
Low Income	-.20	.02	-.04	-.17	.06	-.04
Age 8-11	-.64	.00	-.14	-.63	.00	-.14
Number of Children	.01	.72	.00	.01	.90	.00
Girl	.23	.00	.05	.24	.00	.05
PMK > 34	.10	.16	.02	.10	.15	.02
Mother < HS Degree	-.29	.00	-.07	-.26	.02	-.06
Mother - Some Post HS	.01	.89	.00	.02	.79	.01
Mother - Coll/Univ Degree	.03	.75	.01	.01	.92	.00
Child Care in Other Home	-.11	.41	-.02	-.11	.37	-.02
Child Care in Own Home	.05	.72	.01	.04	.79	.01
Child Care in Centre	-.09	.66	-.02	-.11	.58	-.02
Other Child Care	.22	.39	.05	.23	.37	.05
Hrs. in Child Care	.00	.64	.00	.00	.66	.00
Mother Works Full-Time	-.11	.22	-.02	-.10	.24	-.02
Mother Works Part-Time	-.09	.31	-.02	-.10	.23	-.02
Years at Address	.02	.02	.01	.02	.02	.01
Neighborhood Is Safe	.00	.99	.00	.00	.90	.00
Neighborhood Has Problems	-.09	.00	-.02	-.09	.00	-.02
Neighborhood Is Cohesive	.03	.05	.01	.02	.17	.01
PMK's Health - Excellent	--	--	--	.51	.00	.11
PMK's Health - Very Good	--	--	--	.27	.00	.06
PMK's Health - Fair	--	--	--	.11	.49	.02
PMK's Health - Poor	--	--	--	.06	.90	.01
Constant	.84	.00	--	.66	.00	--
Pseudo R2	.04			.05		

Number of Observations = 12,107. Sample proportion = 66%. Also included are dummy variables for each province.

Table 5

Logit Estimates of No Emotional Health Problems

	Coefficient	P - value	Marg Effect	Coefficient	P - value	Marg Effect
Lone Mother	-.52	.00	-.05	-.51	.00	-.05
Low Income	-.09	.50	-.01	-.05	.71	.00
Age 8-11	-.85	.00	-.08	-.84	.00	-.08
Number of Children	.08	.18	.01	-.09	.13	.01
Girl	.35	.00	.03	.36	.00	.03
PMK > 34	.17	.10	.02	.17	.11	.02
Mother < HS Degree	-.21	.17	-.02	-.18	.24	-.02
Mother - Some Post HS	.12	.36	.01	.12	.39	.01
Mother - Coll/Univ Degree	-.09	.51	.01	-.11	.44	.01
Child Care in Other Home	-.39	.05	.04	-.39	.05	.04
Child Care in Own Home	-.09	.69	.01	-.11	.65	.01
Child Care in Centre	-.30	.36	.03	-.32	.33	.03
Other Child Care	.09	.77	.01	.12	.71	.01
Hrs. in Child Care	.01	.11	.00	.01	.12	.00
Mother Works Full-Time	.01	.96	.01	.01	.93	.01
Mother Works Part-Time	-.12	.40	-.01	-.13	.36	-.01
Years at Address	.02	.20	.00	.01	.22	.00
Neighborhood Is Safe	.06	.19	.01	.06	.22	.01
Neighborhood Has Problems	-.08	.01	-.01	-.08	.01	-.01
Neighborhood Is Cohesive	.07	.00	-.01	.07	.00	-.01
PMK's Health - Excellent	--	--	--	.51	.00	.05
PMK's Health - Very Good	--	--	--	.26	.03	.02
PMK's Health - Fair	--	--	--	.26	.29	.02
PMK's Health - Poor	--	--	--	.05	.91	.01
Constant	2.04	.00	--	1.85	.00	--
Pseudo R2	.06			.05		

Number of Observations: 12,107. Sample proportion = 90%. Also included are dummy variables for each province.

Table 6

Logit Estimates of No Cognitive Health Problems

	Coefficient	P - value	Marg Effect	Coefficient	P - value	Marg Effect
Lone Mother	-.08	.47	-.01	-.07	.50	-.01
Low Income	-.20	.05	-.03	-.16	.12	-.03
Age 8-11	-.57	.00	-.10	-.57	.00	-.10
Number of Children	.00	.95	.00	-.01	.86	.00
Girl	.35	.00	.06	.36	.00	.06
PMK > 34	.07	.37	.01	.07	.37	.01
Mother < HS Degree	-.13	.25	-.02	-.09	.43	-.01
Mother - Some Post HS	.10	.34	.02	.09	.41	.01
Mother - Coll/Univ Degree	.14	.19	.02	.11	.28	.02
Child Care in Other Home	-.15	.32	-.03	-.16	.27	-.03
Child Care in Own Home	.06	.72	.01	.04	.79	.01
Child Care in Centre	-.12	.58	-.02	-.14	.51	-.03
Other Child Care	.27	.35	.04	.29	.34	.04
Hrs. in Child Care	.00	.96	.00	.00	.99	.00
Mother Works Full-Time	-.20	.05	-.03	-.19	.26	-.03
Mother Works Part-Time	-.26	.01	-.04	-.27	.01	-.04
Years at Address	.04	.00	.01	.04	.00	.01
Neighborhood Is Safe	-.02	.68	.00	-.02	.61	.00
Neighborhood Has Problems	-.10	.00	-.02	-.09	.00	-.02
Neighborhood Is Cohesive	.04	.02	.01	.03	.09	.01
PMK's Health - Excellent	--	--	--	.65	.00	.11
PMK's Health - Very Good	--	--	--	.29	.01	.05
PMK's Health - Fair	--	--	--	.14	.43	.02
PMK's Health - Poor	--	--	--	.36	.38	.06
Constant	1.14	.00	--	.94	.00	--
Pseudo R2	.04			.05		

Number of Observations = 12,107. Sample proportion = 79%. Also included are dummy variables for each province.

Table 7

Tobit Estimates of HUI2 Utility Score

	Coefficient	P - value	Marg Effect	Coefficient	P - value	Marg Effect
Lone Mother	-.030	.00	-0.01	-.028	.00	-0.01
Low Income	-.016	.00	-0.004	-.012	.00	-0.005
Age 8-11	-.048	.00	-0.02	-.047	.00	-0.02
Number of Children	-.001	.77	-0.0008	-.001	.49	-0.0005
Girl	.016	.00	0.006	.017	.00	0.005
PMK > 34	.006	.09	0.003	.006	.08	0.002
Mother < HS Degree	-.017	.00	-0.006	-.014	.00	-0.005
Mother - Some Post HS	-.004	.36	-0.001	-.005	.24	-0.002
Mother - Coll/Univ Degree	-.001	.77	-0.0002	0	.96	-0.00008
Child Care in Other Home	.007	.15	0.002	-.008	.13	-0.003
Child Care in Own Home	.005	.42	0.001	.004	.57	0.002
Child Care in Centre	-.005	.57	0.005	-.006	.46	-0.002
Other Child Care	.018	.10	-0.0009	.019	.09	0.006
Hrs. in Child Care (00)	.000	.95	-0.00005	0	.95	0.00
Mother Works Full-Time	-.001	.83	0.0004	-.001	.87	-0.001
Mother Works Part-Time	-.004	.31	-0.001	-.005	.20	-0.002
Years at Address	.002	.00	0.0006	.002	.00	0.0006
Neighborhood Is Safe	0	.90	0.0007	0	.91	-0.00005
Neighborhood Has Problems	-.007	.00	-0.002	-.007	.00	-0.002
Neighborhood Is Cohesive	.002	.00	0.0011	.002	.00	0.0006
PMK's Health - Excellent	--	--	--	.038	.00	0.011
PMK's Health - Very Good	--	--	--	.022	.00	0.007
PMK's Health - Fair	--	--	--	.001	.93	0.0002
PMK's Health - Poor	--	--	--	-.004	.82	-0.002
Constant	1.07	.00	0.0964	1.05	.00	0.9695
Pseudo R2	.17			.19		

Number of Observations = 12,107. Sample mean = .97. Also included are dummy variables for each province.

Table 8

0.10 Quantile Regression - HUI2 Utility Score

	Coefficient	P - value	Coefficient	P - value
Lone Mother	-.035	.00	-.031	.00
Low Income	-.010	.02	-.005	.41
Age 8-11	-.031	.00	-.028	.00
Number of Children	-.006	.01	-.007	.00
Girl	.015	.00	.013	.00
PMK > 34	.008	.04	.008	.01
Mother < HS Degree	-.009	.08	-.003	.43
Mother - Some Post HS	-.006	.31	-.008	.07
Mother - Coll/Univ Degree	.000	.97	.000	.91
Child Care in Other Home	.003	.37	-.003	.47
Child Care in Own Home	-.002	.79	-.002	.82
Child Care in Centre	.000	.99	.006	.51
Other Child Care	-.008	.44	-.011	.39
Hrs. in Child Care	.000	.02	.000	.02
Mother Works Full-Time	.005	.10	.005	.20
Mother Works Part-Time	-.002	.66	-.001	.79
Years at Address	.001	.00	.001	.00
Neighborhood Is Safe	.002	.41	.00	.95
Neighborhood Has Problems	-.007	.00	-.007	.00
Neighborhood Is Cohesive	.003	.00	.003	.00
PMK's Health - Excellent	--	--	.031	.00
PMK's Health - Very Good	--	--	.014	.01
PMK's Health - Fair	--	--	-.024	.01
PMK's Health - Poor	--	--	-.068	.14
Constant	.89	.00	.88	.00
Pseudo R2	.02		.08	

Number of Observations = 12,107. Sample mean = .90. Also included are dummy variables for each province.

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