

# Does Family Income Affect the Wellbeing of Children? Evidence from Canadian Child Benefit Expansions

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## **Abstract:**

A vast literature has examined the impact of family income on the health and development outcomes of children. One channel through which increased income may operate is an improvement in a family's ability to provide food, shelter, clothing, books, and other expenditure-related inputs to a child's development. In addition to this channel, many scholars have investigated the relationship between income and the psychological wellbeing of the family. By reducing stress and conflict, more income helps to foster an environment more conducive to healthy child development. In this paper, we exploit changes in child benefits in Canada to study these questions. Importantly, our approach allows us to make stronger causal inferences than has been possible with the existing, mostly correlational, evidence. We first establish that our simulated child benefits measure is predictive for reported child benefits. Using variation in child benefits across province, time, and family type, we use our simulated benefits to study outcomes spanning test scores, mental health, physical health, and deprivation measures. The findings suggest that child benefit programs in Canada had significant positive effects on several measures of both child and maternal mental health and well-being, as well as a few measures of child physical health. Our findings provide some support for the hypothesis that income transfers operate through measures of family emotional well-being. We find less evidence of direct effects of child benefits on test scores.

## **Introduction**

A primary tool for addressing child poverty and increasing the chances for children to succeed in school, and subsequently the labor market, is through child benefits. Almost all developed countries either have direct child benefits or target welfare/social assistance benefits at families with children. These benefits are meant to help achieve several goals. First, by investing in children of lesser means, society aims to provide these children with opportunities to be well adjusted and productive members of society, with improved educational, and later, labor market outcomes. Second, benefit programs allow society to help achieve distributional and equity goals regardless of the future returns of these transfer programs.

Child benefit programs, as well as social assistance programs that target groups such as single parents with young families, transfer income to expand the budget set of qualifying families. There are several potential mechanisms at work after this income is transferred that may result in improved outcomes for children. On the one hand families may simply use the income to purchase more goods and services, including those goods that are valuable in maintaining basic child welfare and also for enhanced child development (food, clothing, books, etc). On the other hand, income transfers may have indirect effects such as reducing stress and improving household relations, increasing the chance and opportunities for employment, and others, which, while not goods and services purchased with the benefit, may benefit family members, including children, and therefore improve their ability to function, learn, and improve themselves.

These two channels, direct purchase of resources useful for child development, and improved emotional wellbeing and parenting practices, are explored in Yeung et al (2002). They suggest different areas where one may wish to examine the potential effects of child benefits, including both measures of purchasing power and actual purchases made, as well as measures of emotional well being—both of the child and, importantly, of the parent.

This paper examines the effects of benefit programs on a wide range of child outcomes, spanning both channels hypothesized above. The paper offers several contributions to the literature in this area. First, it uses an exogenous source of child benefit income based solely on the province of residence, benefit year, and number of children in the family, and importantly, not on income characteristics of the family. Second, it uses a detailed Canadian survey of child well-being that includes several important outcomes of interest spanning test scores, mental health, physical health, and poverty measures. Third, in addition to measures of child well-being we use family expenditure surveys to examine how families use the increased income in greater detail.

Our findings suggest that child benefit programs in Canada had significant positive effects on several measures of both child and maternal mental health and well-being, as well as a few measures of child physical health. Our findings provide some support for the hypothesis in Yeung et al (2002) that income transfers operate through measures of family emotional well-being. We find less evidence of direct effects of child benefits on test scores.

## Previous work

There is an extensive literature on the broader relationship between income and child health and development.<sup>1</sup> Several difficulties make the study of this relationship complex including measuring income, distinguishing between permanent or transitory effects, finding exogenous ways to measure income, capturing the effects of other inputs into this production relationship, and finding the proper outcomes to capture the potential effects. Further, documenting a relationship between family income and child outcomes does not in itself help us understand through which channels income works in order to achieve any measured effects. Mayer (1997) provides a thorough treatment of the sociological theory and developed new empirical evidence based on the NLSY, finding that income was not a strong determinant of long-run outcomes. Blau (1999) presents a discussion of these issues from an economist's perspective and reviews much of the previous literature that does not deal directly with the issue of the endogeneity of income. Using fixed effects models and the NLSY, Blau concludes that the effects of permanent family income on test scores are small compared to other family and child characteristics, leaving income transfers as a poor policy tool to improve the outcomes of low-income children.

On the other hand, a more recent study by Dahl and Lochner (2005), also using the NLSY, finds reasonably substantial effects of income on child test scores. Dahl and Lochner use changes in the earned income tax credit over several years to exogenously identify income through fixed-effect IV models. This identification strategy relies on federal changes in the benefit structure of the EITC and the tax code over time as well as

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<sup>1</sup> See an extensive review of the literature of the determinants of child wellbeing in Haveman and Wolfe (1995).

changes in labour market returns to exogenous maternal characteristics over the same time period, primarily education. A key identifying assumption for this strategy, then, is that the educational changes over time are not correlated with other temporal changes that might also affect the outcomes in question. They also restrict their attention to test scores.

A study in the child development literature by Yeung, Linver, and Brooks-Gunn (2002) focuses on understanding how family income matters for child development. The authors hypothesize and test two channels. The first is that income enables families to purchase inputs that allow for investment in the human capital of their children. The second channel suggests that income allows families to better manage stress, emotional well-being, and family relationships; and that these environments provide a better environment for child development.<sup>2</sup> The authors use the Panel Study of Income Dynamics to test these two perspectives. They find stronger evidence in support of the second hypothesis than the first although these results are primarily based on direct OLS estimates of this relationship including a wide variety of explanatory variables.

In a Canadian study using the National Longitudinal Survey of Children and Youth, Dooley and Stewart (2004) use a variety of OLS and fixed-effects models to estimate the relationship between family income and test scores. The results from these models are similar to those found in Blau (1999) in that they find a small relationship between income and test scores. They also find some limited impact of the consumption channel through measures of children's activities (day camps, sports, etc.) and housing amenities.

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<sup>2</sup> See also Chapter 7 of Mayer (1997) for a discussion and review of the literature on this type of channel.

Our work builds on this literature in a variety of ways. First, we exploit variation over time, across provinces, and across number of children, to develop an exogenous measure of benefit income as an instrument for child benefits. Second, we are able to examine a variety of outcomes, including test scores, but also including a variety of physical and mental health measures. Finally, we also examine the direct effect of benefit income on expenditure patterns of families. As a result we are able to provide an exogenous estimate of the effects of benefit income on a variety of potential pathways for child development, and on a standard set of test score measures to capture child outcomes.

## **Policy**

The Canadian child benefit system consists of two main benefits. First, the Canada Child Tax Benefit (CCTB) is paid to parents of children age 0 to 17. This is a federal benefit initiated in 1993 that pays the same across the country with two small exceptions.<sup>3</sup> The CCTB is payable for a twelve-month period running from July to June, with the amount dependent upon the reported net income of the parents in the previous calendar year.<sup>4</sup> So, the June 2005 to July 2006 maximum annual benefit of \$1,228 per child was reduced based on reported family net income from 2004. Benefits do not depend on earned income specifically, so families with no income still qualify for the benefit. Take-up is high—in many provinces the application is given to families of

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<sup>3</sup> In Alberta, the benefit is differentiated by age of the child. For example, in 2005 children age zero to six received \$1,124 while those age 16 to 17 received \$1,423. Until 1997, benefits paid to Quebec residents depended on how many children were in the family, with higher-order children receiving more benefits.

<sup>4</sup> For 2005, the clawback threshold is \$36,378, with a reduction rate of 2.5 percent for income over that threshold for one-child families, and 5 percent for two or more child families.

newborns and the administration is well-integrated with the tax system so any tax filer who qualifies will be made aware of the transfer. The benefit level was constant in nominal dollars between 1993 and 1999, but has been indexed to CPI inflation since 2000. A small supplement (\$86 annually in 2005) is available for a third or higher order child, and another supplement (\$243 annually in 2005) was available until 2006 for children age zero to six for those not claiming childcare expenses.

The second component of the child benefit system is the National Child Benefit program, begun in 1998. This program is a federal-provincial initiative that features a federally-paid benefit called the National Child Benefit Supplement (NCBS). Provinces, at their discretion, could subtract the NCBS from welfare recipients in their province and use the ‘savings’ to fund different provincial programs and child benefits. This yielded substantial differences in benefits across provinces. In addition, the province of Quebec, while it elected to stay outside the NCB program, instituted major reforms of its child benefits system in 1997 and 2005. The details of each province’s programs are provided in the Appendix. In short, two provinces introduced new transfers that weren’t related to earnings, two provinces introduced earnings-related benefits, and three provinces did both. Quebec also reformed its programs in 1997. Across provinces, there were large differences in the structure of benefits across family size.

The net impact of these changes is a large degree of heterogeneity in child benefits across several dimensions: year, province, number of children, and income. There is no explicit dependence of benefits on marital status or education, but benefit levels across those dimensions will vary through differences in family income. Because our empirical strategy will attempt to exploit only the exogenous components of policy

variation, we concentrate primarily on three dimensions of heterogeneity (year, province, number of children).

In Figure 1 we trace out the average benefits payable across time and for different numbers of children in each province. The main differences stem from the 1998 introduction of the NCB program and its provincial counterparts. Some provinces, such as BC moved a bit earlier. Other provinces, like Prince Edward Island, had no benefit program and so had no province-specific variation. Across other provinces, the biggest differences that can be seen are for the three-child families compared to the one child families.

### **Empirical Strategy**

The crucial empirical challenge for estimating the impact of child benefits on outcomes is unobserved heterogeneity. The solution we employ extracts plausibly exogenous legislative variation in benefits to remove the bias of unobserved correlates of child outcomes. In particular, we use a simulated benefits approach similar to that in Currie and Gruber (1996). The method involves taking a sample of families and pushing them through a tax and benefit simulator 400 times—once for each of the ten provinces, each of the ten years between 1994 and 2003, and of four family sizes (0, 1, 2, or 3 children). We then take the average benefit level for each of these cells. The resulting benefit levels differ across time periods, years, and family sizes only through differences in legislated benefit levels and not by income or any unobservables that may be correlated with income.

To calculate the benefits, we select a ten percent sample of families with children from the Survey of Labour and Income Dynamics between the years 1999 and 2004.

These families are stripped of everything except for marital status and incomes—they are essentially providing nothing more than a reasonable distribution of incomes to use for the simulation. The tax and benefit simulator we employ is the CTaCS package, which is described in detail in Milligan (2007). Importantly, the child benefits components of the calculator were developed by looking directly at the legislation and regulations for each province and coding these parameters and program rules into the calculator. After putting these families through the calculator, we take the mean of the simulated child benefits by province-year-number of children cell.

We take these simulated benefits and estimate first-stage equations of the following type:

$$BEN_{pyki} = \beta_0 + \beta_1 X_{pyki} + \beta_2 SIMBEN_{pyk} + \varepsilon_{pyki}.$$

The indexes on the variables represent provinces (p), years (y), number of children (k), and families (i). The reported child benefit levels  $BEN_{pyki}$  are predicted by the set of observable characteristics  $X_{pyki}$  and the simulated benefit level  $SIMBEN_{pyk}$ . We include not only the main effects of province, years, and number of children, but also the 2<sup>nd</sup> order interactions of these three factors.

The predicted values from our first-stage are then used in a second-stage regression using child outcomes, taking the following form:

$$Outcome_{pyki} = \alpha_0 + \alpha_1 X_{pyki} + \alpha_2 \overline{BEN_{pyki}} + \eta_{pyki}.$$

The predicted value of the child benefit  $\overline{BEN_{pyki}}$  is used to explain various child outcome measures  $Outcome_{pyki}$ . We include the same  $X_{pyki}$  characteristics in the second stage regression including all second order interactions. In this way, the identification of the impact of child benefits comes through the exclusion of the fully saturated third order interactions of the province, year, and number of children effects. So long as the

simulated benefit measure is a good (even if not perfect) predictor of actual benefits and so long as there are no confounding province-year-number of children trends or policies that invalidate the exclusion restriction, the simulated benefit represents a valid instrument.

An important challenge to this identification strategy might come from other policy reforms contemporaneous with the changes in child benefits. For example, provincial spending programs introduced as part of the NCB program could have influenced child welfare. Similarly, other policy reforms such as the subsidized childcare program in Quebec studied in Baker, Gruber, and Milligan (2005) might affect the environment. However, our inclusion of province by year effects adequately controls for most of these concerns. That is, any impact of new provincial spending programs will be picked up by the province-year dummies as there is no reason to expect them to have differentially impacted families with different numbers of children.

Another problem could arise from different labour market cycles across provinces. However, because our identification relies on differences across families of different sizes, this problem only affects our strategy if province-year labour market shocks had a differential impact on families with one versus two versus three children.

## **Data**

We use two data sources for the study. Our primary source for data is the National Longitudinal Study of Children and Youth (NLSCY). This survey focuses on Canadian children, with data currently available for six biannual waves spanning 1994-95 to 2004-05. The content of the survey combines extensive parent-reported health, well-being, and

developmental information on the child and family with detailed labor market and income information for the parents. The survey initially covered children aged 0 to 11 in wave 1 and has followed that initial cohort to ages 8 to 19 in wave 5. Young children were added in each wave to fill in the gap, allowing cross-sectional coverage of all ages.<sup>5</sup>

We use all families in each of the NLSCY waves as well as examining subsets of families with children ages 10 and under. The resulting data set comprises approximately 154,000 observations over six cycles. However, for many of the outcomes we examine the variables are limited to explicit age ranges, making the sample sizes for the analysis considerably smaller than the full data set. Finally, because there is some over-sampling of children in smaller provinces, we use the provided weights to recover population-level results.

The NLSCY contains several variables spanning achievement measures, physical, and mental health including having repeated a grade, a math score, a PPVT score, having been diagnosed with a learning disability, measures of hyperactivity, emotional and anxiety disorders, physical aggression, suffering from hunger, height and weight, and mother's health status. Means and age ranges for the variables presented in Table 2.

Questions are asked of the person most knowledgeable about the child (in 92% of cases this is the mother) about whether the child repeated a grade in past two years. The Peabody Picture Vocabulary Test is administered to children ages 4-6 and is a widely used measure of cognition for preschoolers. In the NLSCY, mathematics tests were administered to children in grades two through ten (beyond the age limits of our sample) and are based on the Canadian Achievement Tests. Response rates for the Math tests are slightly low and various researchers have investigated how these low response rates

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<sup>5</sup> For wave 5, cross-sectional child observations were only added in the age range 0-5. Because the longitudinal cohort was ages 8-19 in wave 5, this left an unfilled gap at ages 6-7 for wave 5.

might bias analysis using the test scores<sup>6</sup> and have concluded that the low response is random, for the most part. The question on learning disabilities asks about whether the child has been diagnosed and is answered by the person most knowledgeable about the child. The questions on mental and emotional health are asked of parents of all children aged 4 through 11 (we list the questions in the data appendix). The responses to these questions are categorized by disorder, and then added together to determine a hyperactivity score (8 questions), an emotional behavior score (8 questions), an aggressive behavior score (6 questions) an indirect aggression score (5 questions), and a prosocial behavior score (10 questions) for the child. The mother's depression score is again based on a series of twelve questions asked to the child's mother about her feelings and behaviour over the past week.

The child and mother health questions are self-reported based on a 5 point scale for self -assessed health of excellent to poor. We combine the bottom three measures for the child as very few parents report their child to be in poor health. Height and weight measures are also self-reported by the parent as are measures of injuries in the past twelve months, and reports of the child experiencing hunger because of lack of resources to buy food.

Parent reports about their children are sometimes thought less reliable. Parents may hold a more optimistic opinion of their child's abilities and activities than a disinterested observer. Beyond any bias in their true assessments, parents might also be reluctant to report low achievements out of shame or embarrassment. On the other hand,

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<sup>6</sup> In cycle 5 the response rate for the mathematics test was 81%. Currie and Stabile (2006) discuss an analysis of the non-responses to the NLSCY math tests for previous cycles performed by Statistics Canada which reports little difference between responders and non-responders at that time. In the cycle 5 codebook, Statistics Canada notes that the response rate is lower in higher grades, and higher among students who performed well on previous cycle math tests.

differences in parent versus expert reports may lie in differences in information—parents may be better informed and thus make more accurate reports.<sup>7</sup> Evidence suggests that parent reports can be reliable in the spheres of motor milestones (Bodnarchuk and Eaton 2004), child health (Spencer and Coe 1996), and behavior and temperament (Clarke-Stewart et al. 2000). However, the validity of the particular measures in the NLSCY may differ from the measures in those studies. A common finding in the literature on validity of parent-reported measures is that the validity of parent-reports for acute events (such as an illness or the reaching of a milestone) is higher than for more general and broad questions.

The other survey we use is the Survey of Labour and Income Dynamics (SLID), stacking together the public-use cross sections for the years 1996 to 2004. The SLID is conducted annually by Statistics Canada with a stratified random sampling of Canadians. With survey weights, the data are potentially nationally representative. The SLID provides detailed information on demographics, and more precise information on income and benefits received over the past year than the NLSCY which allows us to provide more complete income and benefit information to the tax calculator. In particular, the income measures available on the SLID are attached from the respondent's income tax records, which makes them quite relevant for the tax calculator. The sample size per year is around 35 thousand census families made up of 60 thousand individuals aged 15 and higher. As noted earlier we take a 10 percent sample of SLID families to calculate our simulated benefits. We also use the full sample of the SLID in the estimation of the first stage relationship between actual and simulated child benefits.

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<sup>7</sup> See Seifer et al. (2004) for a discussion of these biases. In their experiment, they find that parents' reports for temperament are very similar to expert assessments—but only when the parents are assessing *other people's* children. Parent assessments of their own children are not highly accordant with expert assessments.

## Results

The first set of results we present explores the first stage relationship between our simulated child benefits and actual reported child benefits. Following the discussion of the first stage results, we turn to our analysis of child and family outcomes from the NLSCY, looking at reduced form and IV results in the full sample and in a sample consisting of parents with lower education.

### First stage results

We begin with an analysis of the relationship between our simulated child benefits and actual reported child benefits. This analysis allows us to validate the use of the simulated benefits in reduced form regressions (where we look for the direct effect of the simulated benefits on outcomes). Moreover, the estimates may be used in two-sample IV estimation where the simulated benefits instrument for observed benefits.

These first stage results are performed using the person files of the SLID for the years 1996 to 2004. The SLID includes a much larger sample than the NLSCY, is specifically designed as an income survey, and can be applied to all of the years over our time span of interest. These three reasons make it a preferable data source for validation and estimation of our first-stage relationship.

The results appear in Table 1. Each result in the table comes from a separate regression of reported child benefits on simulated benefits with a set of standard control variables.<sup>8</sup> A clustered standard error is reported beneath in parentheses. The different rows of the table show results from different subsamples of the SLID data. The columns

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<sup>8</sup> The controls include year dummies, province dummies, number of children dummies, respondent and spouse education and age group dummies, a marital status indicator, and age of youngest child dummies.

show results using different formulations of the policy variable. The first column shows results using a difference-in-differences specification that exploits only province-year variation. The second column uses a triple-difference specification with simulated benefits varying on a province-year-number of children basis. The third column is also a triple difference specification, but uses a measure of child benefits that adjusts for the reduction of welfare benefits resulting from the NCB clawback.

The first result is a regression using only families with a child age 0 to 17, which captures any families potentially eligible for child benefits. The reported coefficient of 941 indicates that an extra \$1000 of simulated benefits is predicted to increase reported child benefits by \$941. The result is highly significant and indicates that the simulated benefits are a very precise and accurate predictor of reported child benefits. The coefficient is little-changed in the triple difference specifications in columns two and three. The next row restricts the sample to children age 0 to 10, which is the age range we use for the NLSCY analysis to follow. In this sample, the province-year specification shows an increase in actual benefits of \$1,354 for every \$1,000 of simulated benefits. In the second and third columns, the estimated coefficient falls back under \$1,000. In the subsample containing only those observations where the respondent has high school education or less, the point estimates in the triple-difference specifications are slightly lower at \$860 and \$868, but remain highly significant. In the sample containing only two-parent families, the results look very similar to the base age 0 to 10 results in the second row. In contrast, the results in the sample of single parents show coefficients more than twice as high, indicating that simulated benefits substantially underpredict actual benefits. This may be driven by the fact that single-parent families have lower family income and therefore get more benefits than two-parent families. Because of the

preponderance of two-parent families in the whole sample, the province-year-number of children cell averages for the simulated benefits are dominated by the two-parent families.

Overall, the analysis of the first stage in the SLID gives some confidence that the simulated benefits are good predictors of actual benefits. Because the coefficients are in most specifications so close to \$1 for \$1, reduced form estimates using the simulated benefits will yield results very similar to two-stage estimates using these results as a first stage. In a future revision of this paper we will implement a two-sample IV estimator that fully exploits this strong first stage in the SLID. However, for the results presented below for the NLSCY we show only reduced form results and IV results where the first stage is performed in the NLSCY.

### Full Sample

We first present reduced form estimates of the effects of the imputed benefit income on a series of educational, health and mental health outcomes for children ages zero to ten. These results are presented in the first column of Table 3. Again this benefit measure uses variation across provinces, years, and number of children and is independent of actual family income. Our standard set of controls include all second order interactions as well as dummy variables for sex, urban status, age, family size, immigrant parents, and mothers and father's age.

The four educational measures: grade repetition, PVPT scores, math test scores, and being diagnosed with a learning disability do not show strong positive effects of benefit income. The two test score measures are positive but the effects are statistically

insignificant and very small. The coefficient on grade repetition is statistically significant and the wrong sign.

The second panel shows a set of outcomes that apply to the mental and emotional well-being of the mother and child. We find a negative and significant reduction in the separation anxiety score, the hyperactivity-inattention score, the emotional disorder score, and the conduct disorder score for children ages 4-11. The magnitudes of these effects are reasonable. Another \$1000 of child benefits results in an approximate tenth of a point reduction in the score off a mean of about 4 points.

A particularly interesting coefficient is the coefficient on the mother's depression score which is also negative and significant. The reduction in maternal depression coupled with a reduction in several measures of child mental and emotional well-being lend some support to the hypothesis presented by Brooks-Gunn and others which suggests the emotional stability of the family as a primary channel by which income operates.

The final panel presents physical health measures. Here we find little evidence of a relationship between benefit income and physical health for this population as measured by self assessed health, height, weight, and injuries.

### Families with low-education

We next focus on the population group most likely to be eligible for these benefits, families where the primary care giver (the mother in almost all cases) has high school education or less. Approximately 32 percent of the sample of primary care givers

are low-education and our sample sizes are therefore smaller. The results are presented in the second column of Table 3.

The first panel presents results for the educational outcomes. Once we focus on low-education families the strange positive result for grade repetition goes away and we now find a positive effect on both PPVT and math test scores (although these effects are only significant at the 10% level). An extra \$1000 of child benefits leads to a 7 point increase in the scaled math test off a mean of 387, translating into a 2 percent increase. We also find an increase in the probability that a child is not diagnosed with a learning disability.

The coefficients on the child's mental health remain negative and of a similar magnitude to those in the entire sample but lose some significance. The mother's depression score remains highly significant and the coefficient is considerably larger in this sub-sample. We continue to find little effect on physical health, although among the children of low-education parents we do find a small boost in height that is correlated with increased benefit income.

#### IV for Full Sample

We now turn to some instrumental variables results where we use the predicted benefits as instruments for actual reported benefits in the NLSCY. The question in the NLSCY referring to child benefits asks for information on income over the past twelve months from both federal and provincial child benefits. As noted above, the question was not asked in each year, and we only have information for the cycles starting in 1998

and afterwards. We have checked that differences between the IV results and the reduced form results presented above are not due to the loss of the first two cycles of the NLSCY.

The IV results are for the full sample are presented in the first column of Table 4. The first stage coefficient on predicted benefits is reported at the top of the column. Our predicted benefits do a reasonably good job of predicted reported child benefits. The coefficient for the entire sample is 249, suggesting that each \$1000 of predicted benefits predicts \$249 of actual benefits. Of course, as the predicted benefits are not dependent on the actual income for a family we would not expect to be able to predict the reported child benefits completely.

Our IV results are slightly weaker, but overall quite similar to our reduced form results. The coefficients on grade repetition, math scores, and PPVT scores are all of the expected signs but none are statistically significant. The coefficient on not being diagnosed with a learning disability is statistically significant, but the coefficient quite small. Overall, our IV results, like our reduced form results above do not provide strong evidence of the effects of benefit income on outcomes.

On the other hand, the results for the mental and emotional well-being of the child are, once again, quite strong. The hyperactivity-inattention scores, the prosocial behaviour score, the emotional disorder scores, the conduct disorder score and the indirect aggression scores are all negative and significant. The coefficient themselves are slightly larger than the reduced form results. An additional \$1000 of benefit income results in a reduction of 0.7 of a point on the hyperactivity score, with a mean score of 4 (note that the predicted benefits are measured in thousands of dollars whereas actual reported benefits are measured in dollars). The coefficients on other mental health

measures are of a similar magnitude. As above, there is a strong relationship between benefit income and the mother's depression score.

We once again find little relationship between benefit income and physical health. One exception is that we do find a small positive effect on the probability that the child does not experience hunger (while not directly a health measure, the relationship to nutrition is clearly important to health.)

#### IV for Low Education

The instrumental variables results for the sub-sample of families where the primary care giver has a high school education or less are presented in second column of Table 4. The first stage for this subgroup is slightly stronger than the first stage for the overall sample. This is to be expected given that less educated mothers are more likely to be eligible for child benefits. An additional \$1000 of predicted benefits is associated with \$327 of reported child benefits.

The first panel reports educational outcomes. In the low education IV sample we find a negative and statistically significant effect of benefit income on grade repetition (although the effect is quite small) and a positive but insignificant effect on the scaled math score. We also find a strong positive relationship between benefit income and not being diagnosed with a learning disability.

Interestingly our results for the mental and emotional well-being of the child are weaker when we use IV for low-educated families. The coefficients are of alternating signs and the standard errors considerably larger. Even the depression score for the

mother, which was a very strong result in the other specifications, is the right sign but insignificant here.

Further, our measures of physical health appear to be somewhat stronger for this population and specification than in previous ones. We find a significant reduction in hunger, an increase in height, a decrease in weight, and an improvement in self-assessed overall health.

Overall, this set of IV results, while continuing to suggest a relationship between benefit income and child well-being, differ in interesting ways from the full sample IV and reduced form results presented above.

## Discussion

Our results provide some consistent evidence that benefit income has positive effects on the well-being of children in our sample. Across both reduced form and IV results, and across the entire sample and the sample with less education, we find significant effect of benefit income on the mental health of the mother and child. For the child we find that this effect persists across a wide range of mental health measures. We take this evidence as supportive of the hypothesis presented in the sociology literature that suggests that a major pathway through which income can improve child welfare is through the emotional well-being of both parents and child.

We do also find some, although limited, evidence of the direct effect of income on measures such as hunger. This result was not as consistent across samples and specifications and we will turn to expenditure data to better explore this effect.

Finally we find some limited evidence on the effect of benefit income on grade repetition and test scores. However, while we find little direct effect on the contemporaneous measures, other work has documented the effect of mental health measures on test scores and grade repetition over time (Currie and Stabile, 2006, 2007). Therefore, it is reasonable to expect that even if there is little contemporaneous effect, there would be longer term benefits in these areas acting through the improvements in child mental health.

## **Conclusions**

In this paper, we study the impact of child benefits on measures of health and wellbeing. We find fairly strong evidence that links higher child benefits to improved mental health for both children and their mothers, as well as some weaker evidence in favour of improved educational and physical health outcomes. Our empirical approach based on exogenous policy changes makes us more confident these results are causal than has been possible with the existing, mostly correlational, literature.

Most of the economics research on child benefits has focused on the labor market, educational, and direct-consumption aspects of increased child benefits. We take our findings as evidence that a broader set of outcomes should be included in any assessment of the costs and benefits of expanded transfer payments to families with children.

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**Table 1: First stage results in the SLID**

	Nobs.	(1)	(2)	(3)
Type of variation in policy variable		Province- year	Province- year-number children	Province- year-number children
All kids age 0-17	85396	941 (104)	905 (105)	884 (102)
Just kids age 0-10	55959	1354 (141)	979 (135)	966 (131)
Kids age 0-10 Just highschool or less	17704	980 (260)	860 (177)	868 (179)
Kids age0-10 Two parent	45958	1373 (169)	906 (140)	889 (136)
Kids age0-10 Single	10001	1481 (559)	1947 (168)	1925 (159)

Notes: Regressions using the Survey of Labour and Income Dynamics. Regressors include year dummies, province dummies, respondent and spouse age group dummies, respondent and spouse education group dummies, age of youngest child dummies, and a marital status indicator. The second and third columns also include interaction terms for province\*year, year\*number of children, and province\*number of children.

**Table 2: Descriptive statistics for NLSCY**

	Mean	Standard Deviation	Age Range
<b>Educational Outcomes</b>			
Child has ever repeated a grade	0.029	[0.169]	4-10
Scaled math score	387.153	[89.270]	6-10
Scaled PPVT score	99.899	[15.350]	4-6
NOT been diagnosed with learning disability	0.969	[0.173]	6-10
<b>Mental and Emotional Well Being</b>			
Hyperactivity-inattention score, 4-11	4.364	[3.373]	4-10
Prosocial behaviour score - 4-11	13.068	[3.887]	4-10
Emotional disorder - Anxiety score, 4-11	2.426	[2.411]	4-10
Conduct disorder - physical aggression score	1.421	[1.868]	4-10
Indirect aggression score	0.994	[1.562]	4-10
Mother's Depression Score	4.568	[5.348]	0-10
<b>Health and Nutrition</b>			
Never experienced hunger because of lack of money to buy food	0.987	[0.111]	2-10
In general, child is in good/fair/poor health	0.118	[0.323]	0-10
Current height in metres and centimetres	1.086	[0.245]	0-10
Current weight of child in kilograms.	21.225	[9.752]	0-10
injured in last 12 months	0.094	[0.292]	0-10
Mother health status is excellent	0.354	[0.478]	0-10
<b>Benefit Variables</b>			
Predicted Child Benefits (in 1000s)	1.778	[0.464]	
Reported Child Benefits	2089.82	[2498.86]	
Observations - Full Sample	117419		

Notes: Reported means and standard deviations from the National Longitudinal Study of Children and Youth. Also reported is the age range we use for each outcome.

**Table 3: Reduced form results**

	Full Sample	High School or less
<b>Educational Outcomes</b>		
Child has ever repeated a grade	0.013 [2.38]*	-0.006 [0.79]
Scaled math score	1.940 [1.08]	7.422 [1.83]*
Scaled PPVT score	0.224 [0.58]	1.064 [1.68]
NOT been diagnosed with learning disability	0.004 [0.94]	0.015 [3.30]**
<b>Mental and Emotional Well Being</b>		
Hyperactivity-inattention score, 4-11	-0.100 [2.14]*	-0.147 [1.46]
Prosocial behaviour score - 4-11	-0.107 [1.13]	-0.307 [1.61]
Emotional disorder - Anxiety score, 4-11	-0.100 [1.64]	-0.066 [0.97]
Conduct disorder - physical aggression score	-0.097 [2.64]**	-0.100 [1.81]*
Indirect aggression score	-0.005 [0.22]	-0.063 [1.31]
Mother's Depression Score	-0.225 [2.97]**	-0.615 [4.87]**
<b>Health and Nutrition</b>		
Never experienced hunger because of lack of money to buy food	0.001 [0.48]	0.012 [2.80]**
In general, child is in good/fair/poor health	0.003 [0.88]	0.007 [0.94]
Current height in metres and centimetres	-0.001 [0.62]	0.006 [2.09]*
Current weight of child in kilograms.	-0.074 [1.23]	-0.081 [0.70]
injured in last 12 months	0.005 [1.19]	0.000 [0.03]
Mother health status is excellent	0.008 [0.93]	0.003 [0.29]

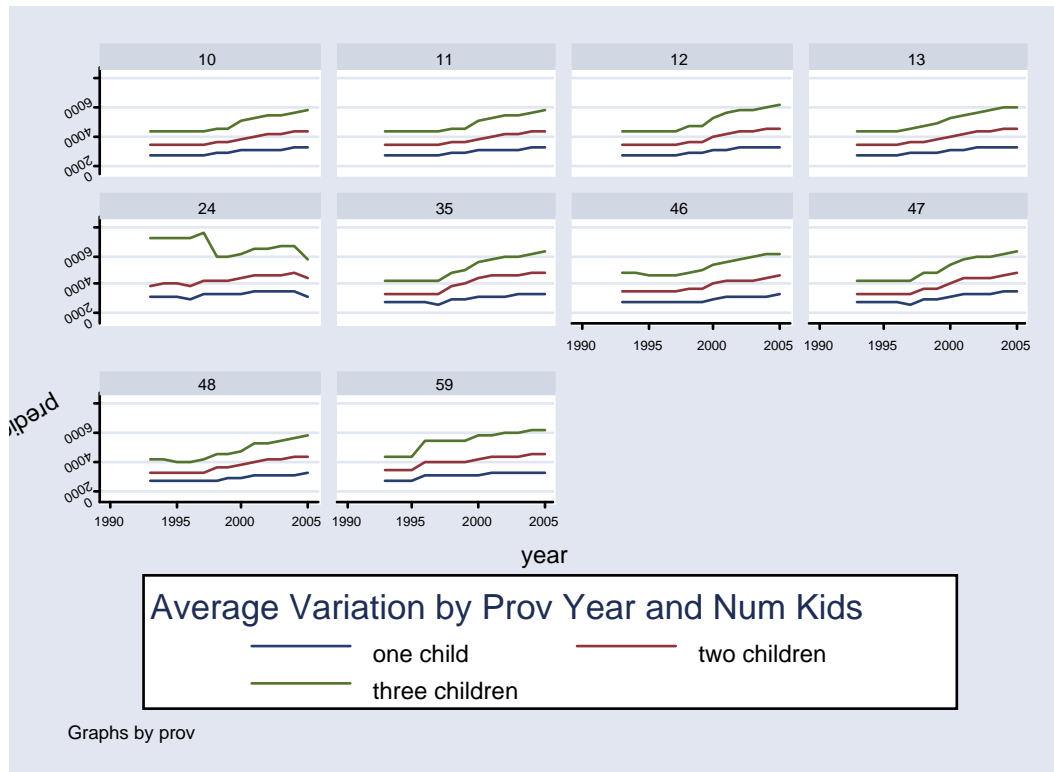
Notes: Table shows the coefficient on simulated benefits for a regression with the indicated variable as the dependent variable. Regressions include full set of control variables indicated in text. T-statistics are reported beneath the estimates, with one star for results significant at the 10 percent level and two stars for those significant at the 1 percent level of significance.

## Table 4: Instrumental variables results

	Full Sample	High School or less
First stage predicted benefit	249.40 [2.25]*	327.00 [2.82]**
<b>Educational Outcomes</b>		
Child has ever repeated a grade	-0.01 [1.26]	-0.06 [2.22]*
Scaled math score	15.68 [0.98]	45.49 [1.31]
Scaled PPVT score	0.65 [0.32]	-6.42 [0.79]
NOT been diagnosed with learning disability	0.07 [2.62]*	0.07 [2.74]**
<b>Mental and Emotional Well Being</b>		
Hyperactivity-inattention score, 4-11	-0.69 [3.25]**	0.41 [0.61]
Prosocial behaviour score - 4-11	-0.72 [2.41]*	-0.64 [1.51]
Emotional disorder - Anxiety score, 4-11	-0.43 [1.73]*	-0.19 [0.75]
Conduct disorder - physical aggression score	-0.63 [4.08]**	0.09 [0.40]
Indirect aggression score	-0.33 [1.92]*	0.41 [1.23]
Mother's Depression Score	-0.97 [2.30]*	-3.30 [1.40]
<b>Health and Nutrition</b>		
Never experienced hunger because of lack of money to buy food	0.03 [2.84]**	0.03 [2.06]*
In general, child is in good/fair/poor health	-0.03 [1.20]	0.08 [2.17]*
Current height in metres and centimetres	0.01 [1.40]	0.03 [2.59]*
Current weight of child in kilograms.	-0.38 [1.87]*	-1.09 [1.77]*
injured in last 12 months	-0.01 [0.53]	-0.06 [1.18]
Mother health status is excellent	0.03 [0.77]	0.00 [0.10]

Notes: Table shows the second stage coefficients on reported benefits for regressions with the indicated variables as the dependent variable. Regressions include full set of control variables indicated in text. T-statistics are reported beneath the estimates, with one star for results significant at the 10 percent level and two stars for those significant at the 1 percent level of significance.

**Figure 1: Policy differences across province, time, and family size**



## **Appendix A: National Child Benefit and Provincial Programs**

### Federal:

The National Child Benefit Supplement began in 1998. The rates for 2005-06 were \$1,722 annually for a first child, \$1,502 for the second, and \$1,420 for a third child. These rates are approximately triple what was in place in 1998. The family income threshold for the clawback of these benefits in 2005 was \$21,480. The clawback rates were 12.2% for one child families, 22.8% for two child families, and 32.9% for three or more child families.

Unless otherwise mentioned, the provincial benefits described below were administered by the Canada Revenue Agency and integrated in one monthly payment with the federal CCTB and NCBS.

Several provinces reduced provincial social assistance payments dollar for dollar with the NCBS payments. Other provinces adjusted their social assistance payment schedule. These details are noted for each province below.

### Newfoundland and Labrador:

The Newfoundland Child Benefit was introduced in 1999. In 2005, the annual rate for a first child was \$250, \$326 for a second child, \$350 for a third child, and \$375 for a fourth child. The clawback of these benefits was in the income range \$17,397 to \$21,480. An additional supplement for children age zero was added in 2001. This paid \$540 annually in 2005.

Social assistance payments were not clawed back, but the adjustment for family size in social assistance payments was changed in 1999 when the Newfoundland Child benefit was introduced..

### Prince Edward Island:

No child benefit program. Full reduction of NCBS payment on provincial social assistance payments.

### Nova Scotia:

The Nova Scotia Child Benefit started in 1998. Families with 1 to 3 children receive different payments. Initially in 1998, the payments ranged from \$250 for the first child to \$136 for a third (or higher) child. In 2001, the payments for third and higher children increased substantially. In 2005, the payment rates were \$445 annually for a first child, \$645 for a second, and \$720 for a third. These benefits are clawed back at high clawback rates for incomes over \$16,000.

Full reduction of social assistance payments until 2001. After 2001, the social assistance payment structure for family size was adjusted instead.

### New Brunswick:

The New Brunswick Child Tax Benefit was introduced in 1997, before the national NCB program reached its start. The benefit is \$250 per child annually, and has not changed since 1997. The benefit is clawed back at 2.5% or 5% for family net income over \$20,000. In addition, there is a Working Income Supplement of \$250 annually that is phased in at 4% for earned income over \$3,750 and clawed back at a rate of 5% for family net income over \$20,921.

New Brunswick never reduced social assistance payments.

### Quebec:

Until 1997, residents of Quebec were eligible for a family allowance, an allowance for young children, and an allowance for newborn children. These amounts increased with the number of children in the family and did not depend on family income. In 1997, these were combined into a new family allowance. The rates for the new family allowance were \$2,275 per child for a single parent family and \$975 per child for a two-parent family. These amounts were clawed back starting at incomes of \$15,332 for singles and \$21,825 for two-parent families. However, the clawback only took benefits down to a minimum benefit level that was \$80 annually for one and two child families and \$975 for three child families. But, for those with family net incomes higher than \$50,000 these 'minimum' benefits were clawed back at a rate of 5%. In Quebec there was also an earned income benefit called APPORT in place from 1988 to 2004. In 2004, this benefit was phased in for earnings over \$1,200 at a rate of 35% until an earnings level of \$11,370 (two-parent) or \$7,790 (one-parent), and then clawed back at 43% after that. At the peak benefit level the benefit amount was quite large, but take-up of this benefit was not high.

In 2005 a new Child Assistance program replaced the family allowance and a new Work Premium replaced APPORT.

There was no reduction in social assistance payments for NCBS income, but social assistance and other child benefits were reformed in 1997.

### Ontario:

Ontario introduced the Ontario Child Care Supplement for Working Parents in 1997. The initial rates were \$400 per child age 0 to 6, clawed back at 4% for net family income over \$20,000. In 1998, the amounts were revamped and largely stayed the same until 2005. From 1998, the amount was phased in with earned income over \$5000, at a rate of 20% for 1998 and 21% from 1999 to 2005. The 2005 benefit amount was \$1,100 per child age 0 to 6 for a one-parent family and \$1310 for a two-parent family. The clawback rate was 8% for incomes over \$20,000.

Full reduction of social assistance for NCBS payments until July 2004. From 2004, the increments to NCBS were protected from the reduction.

### Manitoba:

There was no new benefit specifically part of the NCB program in Manitoba, but a pre-existing benefit called CRISP was in existence since the 1980s. It required a separate provincial application and social assistance recipients were not eligible. In 2005, CRISP paid \$360 annually per child, with a clawback rate of 2.083% for incomes over \$12,384. These amounts had not changed in nominal terms since the 1980s.

Full reduction of social assistance payments for NCBS benefits until 2001. From 2001, no reduction for children under age 7. From 2003, no reduction for children under age 12.

### Saskatchewan:

The Saskatchewan Child Benefit was introduced in 1998. In the first year, it paid \$900 annually to a one child family, \$1,104 for a second child, and \$1,176 for a third. As the NCBS increased in the following years, the Saskatchewan Child Benefit was decreased downward dollar for dollar, so that by 2005 it paid only \$7 annually for a 2nd child and \$86 for a third. It is clawed back at high rates for family net incomes over \$15,921. Additionally, there is a working income supplement in Saskatchewan. In 2005 the amount ranges from \$2,385 for a one child family to \$4,293 for a five child family. It is phased in for earnings over \$1,500 at rates between 25% and 45% and clawed back at a 20% rate for incomes over \$14,640. There is a supplement for children under age 13 that pays an extra 25% on top of the regular employment supplement.

There was no reduction in social assistance payments, but as noted above the Saskatchewan Child Benefit shrank dollar for dollar with NCBS increases through time.

### Alberta:

Alberta has an employment-related child benefit. It was introduced in 1997 with a phase-in rate of 8% for earnings over \$6,500 up to a maximum of \$250 for one child and \$500 for two or more. The benefit is clawed back at a rate of 4% for incomes over \$25,000. Between 1998 and 2004, the benefit maximum was set at \$500 for one child and \$1000 for two or more children, but was otherwise similar to 1997. The benefit changed again for the 2005 year.

There is full reduction of social assistance payments for the NCBS benefits.

### British Columbia:

The BC Family Bonus was introduced in 1996, two years before the NCB program. The Bonus rate was \$1,236 per child and was clawed back at a rate of 8% for one child and 16% for two or more for incomes higher than \$18,000. These amounts were increased to \$1,332, 9%, 18%, and \$20,500 in 2001 and have remained constant since. However, the NCBS is subtracted from the BC Family Bonus, rendering it to zero by 2005 since the NCBS is now larger than the prescribed BC Family Bonus payments. There is also a BC Earned Income Benefit that was introduced in 1998. It pays differing amounts for each child and is phased in between earnings levels of \$3,750 and \$10,000. It is clawed back for incomes higher than \$20,921 at high rates. The amounts for 2005 are \$365 for the first child, \$370 for the second, and \$372 for the third or higher. Until 2003, the amount for the first child was \$605, with \$405 for the second and \$330 for the third.

There is no reduction of social assistance for the NCBS payments, but the NCBS payments reduced the BC Family Bonus as described above.

## Appendix B: Questionnaire extracts

### Mental Health Variables

#### 1. **Hyperactivity Score** in Cycle 1 (1994). From abecs06. Questions:

- a) HOW OFTEN WOULD YOU SAY THAT %FNAME%: Can't sit still, is restless or hyperactive?
- b) HOW OFTEN WOULD YOU SAY THAT %FNAME%: Is distractible, has trouble sticking to any activity?
- c) HOW OFTEN WOULD YOU SAY THAT %FNAME%: Fidgets?
- d) HOW OFTEN WOULD YOU SAY THAT %FNAME%: Can't concentrate, can't pay attention for long?
- e) HOW OFTEN WOULD YOU SAY THAT %FNAME%: Is impulsive, acts without thinking?
- f) HOW OFTEN WOULD YOU SAY THAT %FNAME%: Has difficulty awaiting turn in games or groups?
- g) HOW OFTEN WOULD YOU SAY THAT %FNAME%: Cannot settle to anything for more than a few moments?
- h) HOW OFTEN WOULD YOU SAY THAT %FNAME%: Is inattentive?

#### 2. **Emotional Disorder Score** in Cycle 1 (1994). From abecs08. Questions:

- a) HOW OFTEN WOULD YOU SAY THAT %FNAME%: Seems to be unhappy, sad or depressed?
- b) HOW OFTEN WOULD YOU SAY THAT %FNAME%: Is not as happy as other children?
- c) HOW OFTEN WOULD YOU SAY THAT %FNAME%: Is worried?
- d) HOW OFTEN WOULD YOU SAY THAT %FNAME%: Cries a lot?
- e) HOW OFTEN WOULD YOU SAY THAT %FNAME%: Appears miserable, unhappy, tearful, or distressed?
- f) HOW OFTEN WOULD YOU SAY THAT %FNAME%: Is nervous, highstrung or tense?
- g) HOW OFTEN WOULD YOU SAY THAT %FNAME%: Has trouble enjoying %him/her%self?
- h) HOW OFTEN WOULD YOU SAY THAT %FNAME%: Is too fearful or anxious?

#### 3. **Aggression Score** in Cycle 1 (1994). From abecs09. Questions:

- a) HOW OFTEN WOULD YOU SAY THAT %FNAME%: Gets into many fights?
- b) HOW OFTEN WOULD YOU SAY THAT %FNAME%: When another child accidentally hurts %him/her% (such as by bumping into %him/her%), assumes that the other child meant to do it, and then reacts with anger and fighting?
- c) HOW OFTEN WOULD YOU SAY THAT %FNAME%: Physically attacks people?
- d) HOW OFTEN WOULD YOU SAY THAT %FNAME%: Threatens people?
- e) HOW OFTEN WOULD YOU SAY THAT %FNAME%: Is cruel, bullies or is mean to others?
- f) HOW OFTEN WOULD YOU SAY THAT %FNAME%: Kicks, bites, hits other children?

#### 4. **Prosocial Behaviour Score** in Cycle 1 (Variable:ABECS07 ) ages 4-11

The total score varies from 0 to 20, a high score indicating prosocial behaviour

- a) Using the answers never or not true, sometimes or somewhat true, or often or very true, how often would you say that %fname%: shows sympathy to someone who has made a mistake?
- b) HOW OFTEN WOULD YOU SAY THAT %FNAME%: Will try to help someone who has been hurt?

- c) HOW OFTEN WOULD YOU SAY THAT %FNAME%: Volunteers to help clear up a mess someone else has made?
- d) HOW OFTEN WOULD YOU SAY THAT %FNAME%: If there is a quarrel or dispute, will try to stop it?
- e) HOW OFTEN WOULD YOU SAY THAT %FNAME%: Offers to help other children (friend, brother or sister) who are having difficulty with a task?
- f) HOW OFTEN WOULD YOU SAY THAT %FNAME%: Comforts a child (friend, brother, or sister) who is crying or upset?
- g) HOW OFTEN WOULD YOU SAY THAT %FNAME%: Spontaneously helps to pick up objects which another child has dropped (e.g. pencils, books, etc.)?
- h) HOW OFTEN WOULD YOU SAY THAT %FNAME%: Will invite bystanders to join in a game?
- i) HOW OFTEN WOULD YOU SAY THAT %FNAME%: Helps other children (friends, brother or sister) who are feeling sick?
- j) HOW OFTEN WOULD YOU SAY THAT %FNAME%: Takes the opportunity to praise the work of less able children?

### **5. Indirect Aggression Score in Cycle 1 ages 4-11**

The total score varies from 0 to 10, a high score indicating behaviour associated with indirect aggression.

- a) HOW OFTEN WOULD YOU SAY THAT %FNAME%: When mad at someone, tries to get others to dislike that person?
- b) HOW OFTEN WOULD YOU SAY THAT %FNAME%: When mad at someone, becomes friends with another as revenge?
- c) HOW OFTEN WOULD YOU SAY THAT %FNAME%: When mad at someone, says bad things behind the other's back?
- d) HOW OFTEN WOULD YOU SAY THAT %FNAME%: When mad at someone, says to others: let's not be with him/her?
- e) HOW OFTEN WOULD YOU SAY THAT %FNAME%: When mad at someone, tells the other one's secrets to a third person?

### **6. Adult Health Depression Score**

- a) HOW OFTEN YOU HAVE FELT OR BEHAVED THIS WAY DURING THE PAST WEEK: I did not feel like eating; my appetite was poor.  
 1 RARELY OR NONE OF THE TIME (LESS THAN 1 DAY)  
 2 SOME OR A LITTLE OF THE TIME (1-2 DAYS)  
 3 OCCASIONALLY OR A MODERATE AMOUNT OF TIME (3-4 DAYS)  
 4 MOST OR ALL OF THE TIME (5-7 DAYS)
- b) HOW OFTEN YOU HAVE FELT OR BEHAVED THIS WAY DURING THE PAST WEEK: I felt that I could not shake off the blues even with help from my family or friends.

- c) HOW OFTEN YOU HAVE FELT OR BEHAVED THIS WAY DURING THE PAST WEEK: I had trouble keeping my mind on what I was doing.
- d) HOW OFTEN YOU HAVE FELT OR BEHAVED THIS WAY DURING THE PAST WEEK: I felt depressed.
- e) HOW OFTEN YOU HAVE FELT OR BEHAVED THIS WAY DURING THE PAST WEEK: I felt that everything I did was an effort.
- f) HOW OFTEN YOU HAVE FELT OR BEHAVED THIS WAY DURING THE PAST WEEK: I felt hopeful about the future.
- g) HOW OFTEN YOU HAVE FELT OR BEHAVED THIS WAY DURING THE PAST WEEK: My sleep was restless.
- h) HOW OFTEN YOU HAVE FELT OR BEHAVED THIS WAY DURING THE PAST WEEK: I was happy.
- i) HOW OFTEN YOU HAVE FELT OR BEHAVED THIS WAY DURING THE PAST WEEK: I felt lonely.  
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- j) HOW OFTEN YOU HAVE FELT OR BEHAVED THIS WAY DURING THE PAST WEEK: I enjoyed life.
- k) HOW OFTEN YOU HAVE FELT OR BEHAVED THIS WAY DURING THE PAST WEEK: I had crying spells.
- l) HOW OFTEN YOU HAVE FELT OR BEHAVED THIS WAY DURING THE PAST WEEK: I felt that people disliked me.