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THE EFFECTS OF LOW BIRTHWEIGHT AND OTHER MEDICAL RISK FACTORS ON RESOURCE UTILIZATION IN THE PRE-SCHOOL YEARS

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ABSTRACT

This study compares resource utilization of pre-school aged children who are at medical risk with their healthier pre-school aged peers. Medical risk is defined as having been born of low birthweight, having an activity limitation, having a chronic health condition, or having a handicapping condition. Resources include: child care, pre-school, kindergarten, Headstart programs, and medical resources. The study uses two distinct data sets. The first is the National Health Interview Survey's Child Health Supplement of 1988, with approximately 2,500 children aged 3 to 5. The second data set is the National Household Education Survey of 1991, which consisted of about 6,700 children who were aged 3 to 5. The study uses a multivariate analysis to explore differences between at-risk and healthier peers, holding constant a variety of social and economic factors.

The study finds consistent results that at-risk pre-school aged children are more likely to become hospitalized and are less healthy than their healthier peers, holding constant social and economic factors. In addition, they are more likely to delay entry into kindergarten. There is no evidence for differences in amount or type of child care or in mother's labor force participation. There is some evidence that at-risk children consume more pre-school resources.

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The Effects of Low Birthweight and other Medical Risk Factors on Resource Utilization in the Pre-School Years

Numerous studies have examined the medical and developmental condition of children who were born of low birthweight. The majority of these studies assess the children from a diagnostic perspective, reporting scores on medical, developmental, intelligence, and psychological tests. Because of the improvements in neonatology in the past few decades, survival rates of the very and extremely low birthweight (less than 1500 grams, and less than 750 grams, respectively) children have improved dramatically. As a result, most recent studies have focused on the very and extremely low birthweight survivors. Recent examples include: Abel-Smith and Knight-Jones (90), Astbury et al. (87), Breslau et al. (88), Hack et al. (90, 91), Hoy et al. (92), Klein et al. (88), Lloyd et al. (88), McCormick et al. (88), Nielson and Sapp (91), Rikards et al. (87), Saigal et al. (90, 91), Verkerdy-Lakatos et al. (89), Vohr et al. (91), and Zubrick et al. (88). Ornstein et al. (91) provide a recent review of the literature on follow-up studies of very and extremely low birthweight children. These studies find that the average child who was born of very or extremely low birthweight scores below her normal birthweight peer on most of the neurological and psychological tests.

There have been fewer recent studies which follow children in the 1500 to 2500 gram birthweight category. Some recent ones are: Carran et al. (89), Chaikind and Corman (91), Corman and Chaikind (93), Hawdon et al. (90), Holmes et al. (88), Lagerstrom et al (90, 91), Kalmar and Boronkai (91), and Resnick et al. (92). The studies which examine the higher low birthweight children generally find that although these children perform better than the very low birthweight children, and that the large majority of these children perform normally, that they are at greater risk for experiencing difficulties in school. Specifically, studies find that low birthweight children to be more likely to be referred to special education services, or to repeat a grade.

Given that the majority of low birthweight survivors are in the 1500 to 2500 gram category[1], and that there is evidence that these children do experience difficulties in school, it is important to continue to conduct research on the well-being of this group, as well as to assess the very and extremely low birthweight group. In addition, most of the studies which assess the well-being of low birthweight survivors focus on their test scores, rather than on the more practical issues of resource utilization. Very

few studies compare the utilization of resources of the low birthweight compared to normal birthweight children, once they are released from the hospital. If the low birthweight (and very low birthweight) children perform more poorly on psychological, neurological, and medical tests, how does this translate into the resource utilization required to support them?

The purpose of this study is to expand previous work by examining the resources utilized by medically at-risk children during their preschool (ages 3 to 5) years. This study is similar to a previous analysis by Chaikind and Corman (1993) which examined school-aged children. In that study, the authors found that low birthweight children are more likely to be receiving special education services, and are at great risk for grade repetition. The school-aged low birthweight children were assessed as being less healthy than their normal birthweight peers, however, the risk of hospitalization was greater only for the younger (ages six to ten) rather than the older (ages eleven to fifteen) group. Thus, there was evidence that the children may outgrow some of the health problems.

Recent studies by Kalmar and Boronkai (91) and Holmes et al. (88) find that low birthweight and medically at-risk pre-school aged children perform about as well as their healthier peers on assessments during the pre-school years, but that potential problems begin to emerge once the children enter school. Since other studies have found the school problems, it is especially important to assess the resource utilization of low birthweight children during their pre-school years.

This study focuses on low birthweight children, but also examines children who are medically "at-risk" for other reasons-- they have chronic health conditions, activity limitations, or who are considered handicapped in some way. We compare these medically at-risk children with their healthier peers as to differences in health status, health care utilization, day care, and pre-school utilization, mother's labor force activities and school activities. As in the previous study by Corman and Chaikind (1993), we hold constant the social, demographic, and economic variables which are known to also affect outcomes and utilization rates for children. Thus, our analyses examine that effect of medical risk, after accounting for differences in social, economic and demographic variables.

I. Data and Methodology

This study examines two nationally representative data sets. The first is the Child Health Supplement of the 1988 National Health Interview Survey (NHIS-CHS). From this data set, we examine

approximately 2,500 children aged 3 to 5 in 1988. There is extensive data on their current state of health, medical conditions, and health care utilization, as well as detailed information about child care arrangements. The CHS also includes information about preschool and kindergarten, and about maternal employment. All of the data on the NHIS-CHS are reported by the respondent (generally, the mother). Table 1 describes the independent variables utilized in our statistical analyses, and presents means and standard deviations of the variables, for all observations with non-missing values. This list is similar to the one in Corman and Chaikind (1993), where results for school-aged children are examined. This list contains many of the socio-economic variables found to be related to utilization and outcomes for children. This list is more inclusive than most of the other studies which have examined outcomes for low birthweight children. The last three variables describe the health risk factors of the pre-school aged children. First, we examine whether the child has a chronic health condition . About fifteen percent of the sample of young children were reported to have a chronic health problem. These include: missing or impaired limbs or digits, vision or hearing problems, skin disorders, seizure disorders, speech defects, heart, joint, bone, muscle, or neurological disorders, respiratory, circulatory, digestive, genitourinary, or blood disorders. The second variable describing medical risk is whether or not the child is limited in activities due to a health condition; about five percent of our sample have an activity limitation. Our third variable measuring health risk is low birthweight. About eight percent of our sample were born weighing less than five and a half pounds.

The second data set is the combination of the 1991 National Household Education Survey's (NHES) Preprimary and Primary surveys. There are data on approximately 6,700 children ages 3 to 5 who range from no schooling to second grade. The NHES contains far more detail on preschool arrangements, including Headstart programs, as well as on child care arrangements. There is less detailed health information. The NHES asks whether the child has a handicapping condition: a speech impairment, hearing or vision disability, orthopedic disability, learning or emotional problem, mental retardation, other, or multiple problems. The survey also asks whether the child was born of low birthweight. Table 2 describes independent variables used in the analysis of the NHES. We have tried to make the list of variables in the first two tables as comparable as possible, however, the two data sets differed. First, the NHES includes far less detail on medical risk. In their handicap variable, which

should be somewhat comparable to the chronic conditions in the NHIS-CHS, only about four percent of the sample reported some condition, as compared with about fifteen percent in the NHIS-CHS. The NHES does not report whether the family's income is below some designated poverty level, only reports whether the child lives in an urban area (as opposed to the distinction between city and suburb), and only reports whether there are any siblings in the household (as opposed to the actual number of siblings).

Although the means of most of the variables are quite similar, there are a few differences worth noting. First, the NHES reported about six percent of the pre-school aged children having been born less than five and a half pounds. Children in both samples were born in the 1980's when the incidence of low birthweight, nationally, fluctuated around 6.8%.(U.S. Department of Commerce 1992). Thus, the incidence of low birthweight is above the national average in the NHIS-CHS, and below the national average in the NHES. It should also be noted that in the sample of children with non-missing observations, there are proportionately more black children and fewer Hispanic children in the NHIS-CHS than in the NHES. And, there are proportionately more two parent families and fewer teen mothers in the NHES than in the NHIS-CHS.

Outcome measures fall into three basic categories: health, day care, and school. Since, for the pre-school aged children, it may be difficult to distinguish between a day care and schooling situation, we define these variables in a variety of ways. Many of the outcomes are measured in a dichotomous variables: whether or not the child (or mother) utilizes some resource. We distinguish between the dichotomous and continuous dependent variables, since the appropriate statistical technique depends on the type of variable. Also, the reader should note that the purpose of the NHIS-CHS was to measure health of the children. Therefore, there is far more detailed information on health in the NHIS-CHS than in the other data set. In addition, the NHES's focus was on pre-school education. And, although some of the variables seem comparable, the NHES asked far more detailed information about the school activities of the children than did the NHIS-CHS.

Basically, all analyses are variations of the multiple regression technique, using the variables in either Table 1 or Table 2 as the independent variables. In all cases, only one measure of health risk is used at a time. Thus, when using the NHIS-CHS, we include either low birthweight, activity limitations or chronic conditions with the other variables in Table 1 as independent variables. For the NHES, we

use either low birthweight or handicap with the other variables in Table 2. When analyzing dichotomous dependent variables, we use a logistic functional form. When analyzing the continuous dependent variables, we use ordinary least squares. Tables 3A through 8A present descriptions and means of all of the dependent variables used in the analyses. Tables 3A, 5A, 7A and 8A present dependent variables from the NHIS-CHS data set and Tables 4A and 6A present dependent variables from the NHES data set.

Table 3A presents descriptions and means for the dichotomous non-health dependent variables for the NHIS-CHS. These variables measure whether the child has some kind of child care, what kind of care, whether the child attends a pre-school or kindergarten or elementary school, and whether the mother works. In our sample, over half of the mothers of the pre-school children worked outside of the home. Table 5A presents information on the continuous non-health dependent variables for the NHIS-CHS. Altogether, there are a number of alternative measures of the same types of variables. The purpose of all of these measures is to assess the utilization of resources of medically at-risk children in the preschool years.

Tables 4A and 6A present descriptions and means for the dichotomous and continuous dependent variables, respectively, using the NHES data set. The dichotomous variables are comparable to the NHIS-CHS with a few exceptions. The NHES includes information on whether the child attends any program which is a Headstart program. Also, the NHES asks the respondent whether the child delayed entering kindergarten, or whether the parent plans to have the child delay entering kindergarten. Because of the young age, parents and educator may not have begun to consider kindergarten attendance of the child. Later in the paper, we explore kindergarten delay for children who are six to eight years of age. The NHES does not include a variable indicating that the child has changed child care arrangements in the past year. Note that for both samples, when describing the quality of the preschool or child care environment in a continuous variable, we only include observations where the child participated in the program.

Table 7A presents dichotomous health variables from the NHIS-CHS. There are fifteen dichotomous dependent variables. For HEAL1 and HEAL2, a one indicates good health. For HEAL3 through HEAL5, a one indicates poor health. PROBS through CON2 measure whether the child has any current health problems. BDY1 and BDY2 measure whether the child has spent days in bed due to a

chronic condition or serious illness, respectively. HOSNITE1, HOSNITE2, and HOSNITE measure whether the child has spent a night in the hospital due to a chronic condition, serious illness, or either, respectively. Here, we exclude hospitalizations due to an accident, injury, or poisoning. Finally, SURGERY measures whether the child has had some surgery. We do not include doctor's visits, since this variable is as much related to the parent's attitudes and access to health care as it is to medical need. We assume that hospitalizations and surgeries, in particular, are more related to medical need than to parental attitudes. From Table 7A, we can conclude that the vast majority of pre-school aged children in the NHIS-CHS are in good health. Note that there are no comparable health variables in the NHES data set.

Table 8A presents descriptions and means for the continuous health variables in the NHIS-CHS. WBEDDAYS measures the number of bed days due to illness in the past two weeks. Here, we include several hospitalization variables. In addition to including hospitalizations specifically for chronic conditions, serious illnesses or both, we also include HOS2, which includes short-stay hospitalizations for any reason. The means represent all children, most of whom have zero hospital nights.

II. Results

Tables 3A-3C and 4A-4B present results using the logistic function form in a multivariate analysis on the dichotomous non-health variables. Tables 3A through 3C report results using the NHIS-CHS and Tables 4A through 4B report results using the NHES. In all cases, each row corresponds to one logistic regression result, where the only coefficient reported is the coefficient on the effect of the medical risk variable on the dependent variable, holding constant all of the other independent variables. Thus, for example, Table 3A summarizes results from thirteen separate logits, each using the same independent variables from Table 1: the first sixteen variables plus low birthweight. Tables 3A and 4A present results using low birthweight as the medical risk variable, holding constant the other demographic and economic variables. The coefficient and standard error represent the actual logit coefficient. For ease of interpretation, the OLS-type coefficients represent the marginal effect of low birthweight (from zero to one), interpreted at the mean of the distribution[2]. In the Appendix Tables, we present samples of the full set of results. Appendix Table A-1 presents a full set of results for one of the

non-health logits using the NHIS-CHS. We include three sets of results-- one for each medical risk variable. Appendix Table A-2 presents a full set of results for one of the non-health logits using the NHES data set. There are two sets of results, here, one for LOWBW and one for HANDICAP. In both cases, we present results using CC1 as the dependent variable. Generally, the social, economic, and demographic variables had their predicted signs.

According to Table 3A, low birthweight has no effect on any of the child care, schooling, or maternal labor force variables. Table 4A, using the other data set, shows consistent results. Low birthweight seems to have no effect on pre-school, child care, or maternal labor supply. The only significant result in either table is that low birthweight results in a greater likelihood that the child will delay entering kindergarten. The OLS-type coefficient indicates that low birthweight results in an increase in the probability of delaying entering kindergarten by about two percentage points or by about 40%[3]. Tables 3B and 3C indicate results using chronic conditions and activity limitations, respectively, as the health risk variables. According to the NHIS-CHS, medical risk does not seem to have a significant effect on child care, school, or maternal employment, no matter how medical risk is defined. This differs from the results in Table 4B, which indicate the effect of having some handicap on these dependent variables. Table 4B indicates that having a handicap results in a significant increase in the probability of being enrolled in some type of pre-school program for children ages 3 to 5. All of the significant coefficients in Table 4B include enrollment in some type of pre-school program. It is notable that having a handicap significantly increases the probability of enrollment in a Headstart program. This result is consistent with one of the aims of the Headstart Program, to service children with some disability. The disparate results between the two data sets may have two reasons. First, HANDICAP may measure something different than activity limitations or chronic conditions. In fact, since having a handicapping condition is one requirement to be admitted to a Headstart program, children may get labeled in order to become enrolled. Thus, there is some possibility that the causality runs in the opposite direction-- being in Headstart may increase the chances of being labeled handicapped. Second, the measures of school attendance may be more precise in the NHES, since pre-school was the focus of the survey.

Tables 5A-5C and 6A-6C show the regression results for the non-health continuous variables. Again, we present examples of full sets of results in Appendix Tables A-3 and A-4 for the NHIS-CHS and NHES, respectively. In the Appendix Tables for the NHIS-CHS, we use CCHOURS1 as the dependent variable, and for the NHES, we use QUALPK as the dependent variable. Tables 5A and 6A indicate the marginal effect of low birthweight on these variables, holding constant all other independent variables. In the NHIS-CHS, low birthweight is not found to have a significant effect on the quantity or quality of child care, or on the quantity of pre-school hours or maternal hours of work. The same is true in the NHES. However, in the NHES, low birthweight is found to have a positive and significant effect on the adult/child ratio in the pre-school program that child attends. For the NHIS-CHS, none of the health risks variables is found to have a significant effect on any of the continuous child care, maternal labor force, or pre-school variables. However, in the NHES, the handicap variable is found to have a significant effect on the quality and number of hours for the pre-school program which the child attends. Having a handicap results in more hours, and in a higher adult/child ratio, in a greater number of adults in the program, and a smaller number of children. The results of these regression analyses are inconclusive. Neither data set finds a significant relationship between medical risk of the child and day care hours, day care quality, or mother's number of hours of work. However, one data set, the NHIS-CHS, finds no significant relationship between medical risk and pre-school hours whereas the other data set, the NHES, does find a significant relationship between pre-school hours and handicap. There are some possible explanations for the disparity. Certainly, the NHES stressed, and asked more detailed questions about, pre-school experiences of the child. And, the 'handicap' variable in the NHES does not have a direct counterpart in the NHIS-CHS. The NHES was the only data set to ask questions about the size and adult/child ratio in the program. Again, there is some possibility of a reverse causality, since being labeled handicapped is a requirement to gain access to a publicly funded handicapped pre-school program, which generally have high adult/student ratios. Another possible reason is the expansion of pre-school handicapped programs in the three years between 1988 and 1991. In academic year 1987-1988, 3.06% of children in the United States were served under the Education of the Handicapped Act (EHA-B). By 1989-1990, this fraction had increased to 3.78%, an increase of over twenty percent in four years[4]. Altogether, the results indicate that if medical risk has any effect on resource utilization of

pre-school aged children, it affects the number of hours and/or the adult/student ratio of the pre-school or school program, and does not seem to have a significant effect on day care or maternal employment variables.

Tables 7A through 7C indicate the effect of medical risk on dichotomous health status and health care variables. Table7A describes the effect of low birthweight, Table 7B describes the effect of a chronic health condition, and Table7C describes the effect of activity limitations. In the logit regressions in 7B, we have excluded dependent variables related to chronic conditions. In logit regressions in 7C, we have excluded activity limitations as a dependent variable. All analyses utilize the NHIS-CHS. A full set of results for the dependent variable HOSNITE appears in Appendix Table A-5. Low birthweight has a significant impact on all health status variables except whether the child has had a serious illness in the past year. In addition, low birthweight increases the probability of spending at least one night in the hospital by about two percentage points--85% of the mean value for this variable. The other measures of health risk are significantly related to poorer health status and greater health care utilization by children. Results in Tables 7A-7C contrast sharply with previous results. Here, all of the coefficients have their expected signs, and most are statistically significant. Health risk is strongly related to poor health status and greater health care utilization in the pre-school years.

Tables 8A-8C report regression results for continuous health dependent variables from the NHIS-CHS A full set of results, using HOSPNTT as the dependent variable, appears in Appendix Table A-6. From the Tables 8A-8C, low birthweight increases the number of hospital nights for a chronic condition or serious illness by about .07 nights, and the number of short-stay nights by about .12 nights. The other variables of health risk are positively and significantly related to bed days and hospital utilization.

Thus far, the results indicate that low birthweight has a significant adverse impact on health of pre-schoolers, and on hospitalizations of these children. In addition, low birthweight seems to have little impact on the quality or quantity of child care and on maternal employment. There was conflicting evidence on the effect of low birthweight on pre-school variables. One data set indicated greater pre-school hours per week for low birthweight children, but the other data set did not. In addition, the data set which measured teacher/student ratios, indicated that low birthweight children attended pre-school programs with greater teacher/student ratios. Thus, there is some possible evidence that low birthweight

children may receive more or higher quality pre-school instruction. Finally, there was evidence that low birthweight children delay entry to kindergarten.

To further explore the issue of kindergarten delay, we examined the Pre-primary and the Primary data sets from the NHES, to investigate whether older low birthweight and/or handicapped children were more likely to delay kindergarten. Using the same demographic and economic independent variables as before, we performed a multivariate parametric model to "failure time" data--age of beginning kindergarten-- with censored values for children who had not yet begun kindergarten. We specified a Weibull distribution for this model. We excluded the children who were in at least first grade, and who had never attended kindergarten. For these analyses, we included not only the children in the three to five age group, but added all children six through eight, excluding children in first or higher grades with missing kindergarten information. Altogether, there were 13,546 observations. The model was run twice, once with HANDICAP as the medical risk variable, and once with LOWBW. In the specification which used low birthweight, the equation was significant at the 1% level, and was significant at the 5% level for handicap. In assessing the magnitude of the differences in age of beginning kindergarten between those with and without medical risk , we calculated predicted variables for those with mean values for all of the other independent variables, and for a value of zero and a value of one for the medical risk variable. For low birthweight children, the average age of beginning kindergarten is 5.68 years, compared to 5.56 years for normal birthweight children . The magnitude of the differences were somewhat smaller for the equations which used HANDICAP, and average age of entering kindergarten of 5.62 for those with a handicap compared to 5.57 for those without.

In addition, we ran logit models predicting the probability of delaying kindergarten for those children who were aged six to eight. Rather than measuring plans, this variable measured what the children actually did. There were about 6,500 children aged six to eight who had or were currently attending kindergarten. Both low birthweight and handicap were significant (1% level) factors in increasing the chance of delayed entry into kindergarten. The magnitudes were about three percentage points and four percentage points, respectively, for low birthweight and handicap. Note that 6.4 percent of the children aged six to eight who attended kindergarten had delayed the start of kindergarten. This contrasts with the younger group, where about 5.4 percent planned or had delayed kindergarten.

III. Discussion

The purpose of this paper has been to assess the additional resources consumed by medically at-risk pre-school aged children compared to their healthier peers. We have focused on low birthweight, but included other medical risk variables as well. We examined medical utilization as well as day care and pre-school programs.

Focusing, first, on medical utilization, we found that low birthweight significantly increased the probability of a hospital stay in the past year by about two percentage points. The regression analyses indicate that low birthweight children spend about .12 extra short-stay nights compared to normal birthweight children. These results are even stronger, examining children with a chronic health condition or an activity limitation. In the former case, the children are about four percentage points more likely to be hospitalized, and almost eight percentage points more likely to undergo surgery than their healthier peers. They spend an additional .05 nights in the hospital per year compared to children without a chronic health condition. Children with an activity limitation are about five percentage points more likely to be hospitalized and about six percentage points more likely to require surgery than their healthier peers. They spend an extra .08 nights in the hospital per year.

In examining the effects of medical risk on child care, we found no differences between children experiencing medical risk and their healthier peers. Using two different data sets, and four definitions of medical risk, we found no effect of the risk on whether the mother worked, on whether the child attended some kind of child care, on the type of care (whether in the home, in another home or a child care center), on the relationship to the provider (whether a relative or non-relative), on whether or not there was a secondary child care arrangement, or on whether there had been any changes in child care arrangements in the previous year. These results held when we performed regression analyses on the continuous counterparts to some of these variables (for example, number of hours mother worked). It is notable that, using the 1972 Health Interview Survey, Salkever (82) found a significant effect of chronic conditions on maternal labor force. In addition, Breslau et al. (82) found that mothers of children with cystic fibrosis, cerebral palsy, myelodysplasia, or multiple physical handicaps were also less likely to work. There are several possible reasons for these differences. First, our definition of chronic conditions includes a number of less severe conditions. Second, overall labor force participation of mothers

increased during this time period. Third, most pubically funded handicapped pre-school programs, which provide an opportunity for the mothers to work, were initiated after these studies.

Our results are somewhat mixed for the effects of medical risk on pre-school arrangements. In examining the effect of low birthweight on the dichotomous variables, the only significant coefficient indicated that low birthweight children were more likely to delay kindergarten. Since low birthweight children are as likely to attend pre-school as their normal birthweight peers, and since most of the children in our sample were in school, this indicates that low birthweight children, most likely , consume more pre-school resources than their normal birthweight peers.

For the other medical risk variables, the NHIS-CHS indicated that medical risk, either in the form of a chronic condition or an activity limitation, had no effect on attendance in preschool programs. In the other data set, however, having some handicap did have a positive impact on attending any kind of pre-school. In addition, handicapped children were found to be about five percentage points more likely to attend a Headstart program. This result is not surprising, given that handicapped is one target group for the Headstart program.

Results from the NHES indicated that low birthweight children who attend pre-school programs tend to be in programs with higher adult/child ratios, about 30% higher than the mean for this variable. The Handicap variable from the data set had a very large impact on the adult/child ratio in the pre-school. and these children attended about two more hours than their normal birthweight peers. It should be noted that in both data sets, there was some but not a lot of intersection between the low birthweight groups, and the other medical risk groups. In the NHES, about 11% of the "handicapped" children were low birthweight, and the other 89% were of normal birthweight. Thus, even though low birthweight children were twice as likely to be handicapped, the majority of handicapped children were not low birthweight. In the NHIS-CHS, we had similar findings--even though low birthweight children were more likely to have health problems, 85% of children with activity limitations were of normal birthweight, and 89% of children with a chronic health condition were of normal birthweight.

In summary, our results indicate that low birthweight children seem to consume very little additional non-medical resources in their pre-school years. This is surprising because recent research (Chaikind and Corman 1991, Corman and Chaikind 1993) has found that low birthweight children are

more likely to need special education services, are more likely to have problems in school performance, and are more likely to repeat a grade in school. Results from this study indicate that school problems begin quickly--low birthweight children are more likely to delay starting kindergarten. In all, our results indicate that the low birthweight children are at an elevated risk for school problems, but do not receive significantly greater non-medical services during their pre-school years than their normal birthweight peers

In contrast, children labeled as "handicapped" seem to receive additional pre-school hours, higher quality, and more Headstart programs than non-handicapped preschoolers. This latter result is tentative, however, and could be a result of the definition of the variable. That is, children with speech, learning or developmental problems who receive special services in the pre-school years are labeled as "pre-school handicapped". It could be that children receiving services are more likely to have their mother label them as "handicapped". Our results are consistent with the policy followed by most states which provide special pre-school educational services only to children who experience measurable delays during the pre-school years.

Notes

[1]About ten percent of the low birthweight children in each of our samples were very low birthweight.

[2]This is calculated as: b (p) (1-p) where b is the coefficient, and p is the value of the dependent variable at its mean.

[3].0209 divided by .0537.

[4]Source: U.S. Department of Education Division of Innovation and Development, Office of Special Education Programs, *Eleventh Annual (and Fifteenth Annual) Report to Congress on the Implementation of the Education of the Handicapped Act*, 1990, 1992..

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Table 1
Means, Independent Variables
1988 National Health Interview Survey - Child Health Supplement (NHIS - CHS)
Children 3-5

Variable	Description	Mean	Stand. Dev.
MALE	One if male	0.500	0.500
MOFIGED	Number of years of mother's education	12.800	2.470
TEENMOM	One if mother was under twenty when first child was born	0.272	0.445
INCOME	Income	31,027.000	21,404.000
BLACK	One if Black	0.155	0.362
HISPANIC	One if Hispanic	0.102	0.303
NE	One if lives in North East	0.194	0.395
SOUTH	One if lives in South	0.327	0.469
WEST	One if lives in West	0.210	0.408
CITY	One if lives in a city	0.323	0.468
SUBURB	One if lives in a suburb	0.432	0.495
TWOPAR	One if lives in two parent household	0.660	0.474
SIBS	Number of siblings	0.931	0.927
NHISPOV	One if below the Health Interview Survey's poverty level	0.171	0.377
MONTHAGE	Age in months	53.800	10.430
AGESQ	Age in months squared	3,001.870	1,127.400
CON1	One if child has a chronic health condition	0.152	0.359
LIM	One if child has an activity limitation	0.046	0.209
LOWBW	One if child born < 5.5 pounds	0.076	0.265
Obs.	2,487		

Table 2
Means, Independent Variables
1991 National Household Education Survey (NHES)
Children 3-5

Variable	Description	Mean	Stand. Dev.
NE	One if child lives in North East	0.1928	0.395
SOUTH	One if child lives in South	0.3254	0.469
WEST	One if child lives in West	0.2282	0.420
URBAN	One if child lives in urban area	0.7984	0.401
BLACK	One if child is Black	0.1311	0.338
HISPANIC	One if child is Hispanic	0.1232	0.329
MALE	One if child is male	0.5109	0.500
MONTHAGE	Age in months	54.2721	10.144
AGESQ	Age in months squared	3,048.3600	1,101.200
INC	Income	36,201.8300	22,831.060
MOFIGED	Number of years of mother's education	12.6200	2.961
TEENMOM	One if mother was under twenty when first child was born	0.2156	0.411
SIBLING	One if child has any siblings	0.8106	0.392
TWOPAR	One if child lives in two parent household	0.7637	0.425
HANDICAP	One if child has handicapping condition	0.0442	0.206
LOWBW	One if child born less than 5.5 pounds	0.0597	0.237
Obs.	6,721		

Table 3A
Results from Non-Health Logits
NHIS-CHS Children 3-5
Effect of Medical Risk Variable: LOWBW

Dependent Variable	Description	Mean	Coeff.	Standard Error	OLS-type coeff.	Obs.
CC1	Child recieves child care from a relative, non-relative or child care center	0.372	.0542	.165	.0127	2479
CC2	CC1 plus after-care from preschool or elementary school	0.472	-.0703	.163	-.0175	2479
CC3	CC2 plus nursery or preschool program	0.595	-.2227	.166	-.0537	2479
CC4	CC3 plus kindergarden or elementary school	0.714	-.2245	.194	-.0459	2479
NURSPS	Child Attends Nursery or Pre-School	0.332	-.1820	.178	-.0404	2446
AHKIND	Child attends kindergarden or first grade	0.214	.3780	.264	.0636	2444
MOMWK4W	Mother worked in the past 4 weeks	0.571	.1784	.164	.0437	2442
SECCARE	Child has a second day care arrangement (versus one or none)	0.085	.4038	.338	.0314	2479
NCHANGES	Child had a change in child care arrangements in past year (includes those with no child care)	0.188	.3436	.222	.0525	2479
WHOCARE2	One if non-relative provider	0.314	-.2794	.173	-.0602	2479
TYPECAR1	One if child care is out of the house	0.366	-.1639	.167	-.0380	2479
TYPECAR2	One if child care is in a center/institution	0.150	-.0052	.230	-.0007	2479

* Significant at 10% level **Significant at 5% level ***Significant at 1% level

Table 3B
Results from Non-Health Logits
NHIS-CHS Children 3-5
Effect of Medical Risk Variable: CHRONIC CONDITIONS

Dependent Variable	Coeff.	Standard Error	OLS-type coeff.	Obs.
CC1	-.1468	.119	-.0343	2479
CC2	-.0248	.119	-.0062	2479
CC3	-.0531	.122	-.0128	2479
CC4	-.1303	.139	-.0266	2479
NURSPS	.0754	.130	.0167	2446
AHKIND	-.2212	.208	-.0372	2444
MOMWK4W	.0236	.121	.0058	2442
SECCARE	-.1577	.196	-.0123	2479
NCHANGES	-.1590	.141	-.0243	2479
WHOCARE2	.0170	.128	.0037	2479
TYPECAR1	-.0173	.122	-.0040	2479
TYPECAR2	.1190	.169	.0152	2479
TYPECAR3	-.0085	.119	-.0021	2479

* Significant at 10% level **Significant at 5% level ***Significant at 1% level

Table 3C
Results from Non-Health Logits
NHIS-CHS Children 3-5
Effect of Medical Risk Variable: ACTIVITY LIMITATIONS

Dependent Variable	Coeff.	Standard Error	OLS-type coeff.	Obs.
CC1	.1096	.209	.0256	2479
CC2	.1866	.207	.0465	2479
CC3	-.0989	.209	-.0238	2479
CC4	-.1945	.248	-.0398	2479
NURSPS	-.2472	.224	-.0549	2446
AHKIND	-.1275	.341	-.0215	2444
MOMWK4W	.0968	.208	.0237	2442
SECCARE	-.2481	.334	-.0193	2479
NCHANGES	.0194	.254	.0030	2479
WHOCARE2	.1490	.228	.0321	2479
TYPECAR1	.3042	.221	.0706	2479
TYPECAR2	-.0347	.282	-.0021	2479
TYPECAR3	.0164	.205	.0040	2479

* Significant at 10% level **Significant at 5% level ***Significant at 1% level

Table 4A
Results from Non-Health Logits
NHES Children 3-5
Effect of Medical Risk Variable: LOW BIRTHWEIGHT

Variables	Description	Mean	Coeff.	Standard Error	OLS-type coeff.	Obs.
CC1	Child recieves child care from a relative, non-relative or child care center	0.4514	.0196	.108	.0049	6721
CC2	CC1 plus after-care from preschool or elementary school	0.4605	-.0030	.108	-.0008	6721
CC3	CC2 plus nursery or preschool program	0.6371	-.0171	.115	-.0040	6721
CC4	CC3 plus kindergarden or elementary school	0.7758	.0681	.138	.0118	6721
TYPECAR1	Child care is out of the house	0.3822	-.1111	.111	-.0262	6721
TYPECAR2	Child care is in a center/institution	0.1910	.0690	.133	.0107	6721
WHOCARE2	Child care provider is a non-relative	0.2855	.0353	.118	.0072	6721
AHKIND	Child attends kindergarden or first grade	0.2424	-.0087	.202	-.0016	6721
HEADSTRT	Child attends or has attended a Headstart Program	0.0998	.1887	.164	.0170	6721
MOMWK	Mother works	0.5577	.0244	.109	.0060	6721
NURSPS	Child is in nursery school or pre-school program	0.3502	.0697	.120	.0159	6721
SECCARE	Child has a second day care arrangement (versus one or none)	0.0565	.2347	.206	.0126	6721
WAITKIND	Child did or plans to delay entering kindergarden	0.0537	.4099**	.210	.0209	6721

* Significant at 10% level **Significant at 5% level ***Significant at 1% level

Table 4B
Results from Non-Health Logits
NHES Children 3-5
Effect of Medical Risk Variable: HANDICAP

Variables	Coeff.	Standard Error	OLS-type coeff.	Obs.
CC1	-.0442	.126	-.0109	6721
CC2	-.0390	.126	-.0110	6721
CC3	.3839***	.138	.0888	6721
CC4	.5386***	.176	.0936	6721
TYPECAR1	-.1966	.131	-.0464	6721
TYPECAR2	-.2504	.170	-.0387	6721
WHOCARE2	.0364	.137	.0074	6721
AHKIND	.0673	.226	.0123	6721
HEADSTRT	.5620***	.178	.0506	6721
MOMWK	-.0781	.125	-.0193	6721
NURSPS	.5891***	.133	.1340	6721
SECCARE	-.1363	.274	-.0073	6721
WAITKIND	.6428***	.205	.0328	6721

* Significant at 10% level **Significant at 5% level ***Significant at 1% level

Table 5A
Results from Non-Health Regressions
NHIS-CHS Children 3-5
Effect of Medical Risk Variable: LOW BIRTHWEIGHT

Variables	Description	Mean	Coeff.	Standard Error	Obs.
CCHOURS1	Number of childcare hours from relative, non-relative or center	14.03	-.2139	1.409	2487
CCHOURS2	Number of childcare hours CCHOURS1 plus nursery/ preschool	21.03	.5041	1.589	2441
TIMENURS	Number of hours in nursery school	7.06	.6562	.9114	2441
QUALCC	Adults per child in child care	.487	.0078	.0060	920
MOMHRSW	Number of hours mother works per week	18.59	-.1000	1.384	2456
CHDNKDS	Number of children in child care arrangement	25.37	-1.230	4.220	1164
CHDNADLS	Number of adults in child care arrangement	1.68	-.3678	.2405	954

* Significant at 10% level **Significant at 5% level ***Significant at 1% level

Table 5B
Results from Non-Health Regressions
NHIS-CHS Children 3-5
Effect of Medical Risk Variable: CHRONIC CONDITIONS

Variables	Coeff.	Standard Error	Obs.
CCHOURS1	.9116	1.040	2487
CCHOURS2	-.0217	1.180	2441
TIMENURS	-.9447	.7357	2441
QUALCC	-.0022	.0400	920
MOMHRSW	-1.164	1.016	2456
CHDNKDS	-1.069	2.875	1164
CHDNADLS	.0363	.1619	954

* Significant at 10% level **Significant at 5% level ***Significant at 1% level

Table 5C
Results from Non-Health Regressions
NHIS-CHS Children 3-5
Effect of Medical Risk Variable: ACTIVITY LIMITATIONS

Variables	Coeff.	Standard Error	Obs.
CCHOURS1	1.325	1.785	2487
CCHOURS2	2.485	20.42	2441
TIMENURS	1.320	1.274	2441
QUALCC	.0879	.0734	920
MOMHRSW	-1.733	1.745	2456
CHDNKDS	3.056	5.078	1164
CHDNADLS	.1300	.2953	954

* Significant at 10% level **Significant at 5% level ***Significant at 1% level

Table 6A
Results from Non-Health Regressions
NHES Children 3-5
Effect of Medical Risk Variable: LOW BIRTHWEIGHT

Variables	Description	Mean	Coeff.	Standard Error	Obs.
CCHOURS1	Number of childcare hours from relative, non-relative or center	9.18	.2148	.8002	6721
CCHOURS2	Number of childcare hours CCHOURS2 plus nursery/ preschool	13.86	.0717	.9442	6721
PREKHRS	Number of hours in nursery school/pre-school	4.45	.2716	.4743	6721
QUALPK2	Adults per child in preschool	.168	.0413***	.0109	1939
QUALCC2	Adults per child in child care	.179	.0034	..0135	1208
DAYCAD2	Number of adults in child care group	2.25	.1061	.1373	1256
DAYCKD2	Number of children in child care group	14.01	.1554	.7525	1214
PREKAD2	Number of adults in preschool group	2.32	.1778	.1264	1973
PREKKD2	Number of children in preschool group	15.01	-1.777***	.5260	1954
MOMHOURS	Number of hours mother works per week	19.18	.1499	.9381	6721

* Significant at 10% level **Significant at 5% level ***Significant at 1% level

Table 6B
Results from Non-Health Regressions
NHES Children 3-5
Effect of Medical Risk Variable: HANDICAP

Variables	Coeff.	Standard Error	Obs.
CCHOURS1	-1.920**	.924	6721
CCHOURS2	.4532	1.091	6721
PREKHRS	1.543***	.5475	6721
QUALPK2	.0922***	.0108	1939
QUALCC2	.0050	.0182	1208
DAYCAD2	.1105	.1802	1256
DAYCKD2	1.665*	1.014	1214
PREKAD2	.3382***	.1209	1973
PREKKD2	-3.048***	.524	1954
MOMHOURS	-.3373	1.084	6721

* Significant at 10% level **Significant at 5% level ***Significant at 1% level

Table 7A
Results from Health Logits
NHIS-CHS Children 3-5
Effect of Medical Risk Variable: LOW BIRTHWEIGHT

Variables		Mean	Coeff.	Standard Error	OLS-type coeff.	Obs.
HEAL1	Health is rated excellent (not good, fair, or poor)	0.802	-.4304**	.177	-.0684	2456
HEAL2	Health is rated excellent or good (not fair or poor)	0.975	-.2554	.417	-.0062	2479
HEAL3	On questionnaire, health is rated 1 or more (zero is the best)	0.455	.3887**	.115	.0964	2479
HEAL4	On questionnaire, health is rated 2 or more	0.222	.6109***	.165	.1055	2479
HEAL5	On questionnaire, health is rated 3 or more	0.110	.6710***	.204	.0657	2479
PROBS	Child has some developmental, learning or behavior problem	0.092	1.163***	.200	.0972	2479
LIM	Child has some activity limitation	0.046	.7416***	.282	.0325	2479
CON1	Child has a chronic health condition	0.152	.5453***	.190	.0703	2479
CON2	Child had a serious illness in last year	0.309	.2123	.164	.0453	2479
BDY1	Child had at least one bed day in past year due to a chronic condition	0.012	.2357	.751	.0028	2212
BDY2	Child had at least one bed day due to a serious illness	0.100	.2732	.238	.0246	2464
HOSNITE1	Child had at least one hospital night due to a chronic condition	0.006	.9374	.781	.0056	2267
HOSNITE2	Child had at least one hospital night due to a serious illness	0.017	.5378	.500	.0090	2479
HOSNITE	Child had at least one hospital night due to an illness or condition	0.022	.8751**	.429	.0188	2263
SURGERY	Child had surgery	0.033	.3322	.410	.0106	2479

* Significant at 10% level **Significant at 5% level ***Significant at 1% level

Table 7B
Results from Health Logits
NHIS-CHS Children 3-5
Effect of Medical Risk Variable: CHRONIC CONDITIONS

Variables	Coeff.	Standard Error	OLS-type coeff.	Obs.
HEAL1	-.6268***	.134	-.0995	2456
HEAL2	-.8824***	.286	-.0215	2479
HEAL3	.6833***	.116	.1694	2479
HEAL4	.8741***	.122	.1510	2479
HEAL5	.9464***	.150	.0927	2479
PROBS	1.5264***	.154	.1275	2479
LIM	2.4562***	.209	.1078	2479
CON2	.6668***	.116	.1424	2479
BDY2	.6522***	.163	.0587	2464
HOSNITE2	.0631	.426	.0011	2479
HOSNITE	1.7140***	.335	.0369	2263
SURGERY	2.4525***	.245	.0783	2479

* Significant at 10% level **Significant at 5% level ***Significant at 1% level

Table 7C
Results from Health Logits
NHIS-CHS Children 3-5
Effect of Medical Risk Variable: ACTIVITY LIMITATIONS

Variables	Coeff.	Standard Error	OLS-type coeff.	Obs.
HEAL1	-2.0506***	.211	-.3256	2456
HEAL2	-2.0545***	.315	-.0501	2479
HEAL3	1.6929***	.247	.4198	2479
HEAL4	1.815***	.204	.3135	2479
HEAL5	2.0957***	.205	.2052	2479
PROBS	2.3716***	.214	.1981	2479
CON1	2.4479***	.208	.3155	2479
CON2	1.5396***	.205	.3287	2479
BDY1	2.0930***	.601	.0248	2212
BDY2	1.7678***	.215	.1591	2464
HOSNITE1	2.3709***	.702	.0141	2267
HOSNITE2	1.7030***	.430	.0285	2479
HOSNITE	2.0784***	.440	.0447	2263
SURGERY	1.7430***	.319	.0556	2479

* Significant at 10% level **Significant at 5% level ***Significant at 1% level

Table 8A
Results from Health Regressions
NHIS-CHS Children 3-5
Effect of Medical Risk Variable: LOW BIRTHWEIGHT

Variable	Description	Mean	Coeff.	Standard Error	Obs.
WBEDDAYS	Beddays in past two weeks	.156	-.0012	.0565	2487
HOSPNT1	Hospital nights in past year for chronic condition in past year	.109	-.0017	.0252	2275
HOSPNT2	Hospital nights in past year for serious illness	.090	.0585	.1062	2479
HOSPNTT	Hospital nights in past year for chronic condition or serious illness	.104	.0746	.1161	2271
HOS2	Hospital nights in past year (short stay)	.120	.1209*	.0634	2487

* Significant at 10% level **Significant at 5% level ***Significant at 1% level

Table 8B
Results from Health Regressions
NHIS-CHS Children 3-5
Effect of Medical Risk Variable: CHRONIC CONDITIONS

Variable	Coeff.	Standard Error	Obs.
WBEDDAYS	.11501***	.0416	2407
HOSPNTT	.1893*	.1176	2271
HOSPNT2	.0038	.0785	2479
HOS2	.1964***	.0466	2487

* Significant at 10% level **Significant at 5% level ***Significant at 1% level

Table 8C
Results from Health Regressions
NHIS-CHS Children 3-5
Effect of Medical Risk Variable: ACTIVITY LIMITATIONS

Variable	Coeff.	Standard Error	Obs.
WBEDDAYS	.3752***	.0711	2487
HOSPNTT	.1869	.1781	2271
HOSPNT1	-.0076	.0075	2275
HOSPNT2	.1682	.1364	2479
HOS2	.5000***	.0797	2487

* Significant at 10% level **Significant at 5% level ***Significant at 1% level

Appendix Table A-1
Non-Health Logits - Full Results
Dependent Variable: CC1
1988 NHIS-CHS
Children 3-5

	Effect of Low Birthweight		*Effect of Chronic Condition*		*Effect of Activity Limitation*	
Variable	**Coefficient**	**Standard Error**	**Coefficient**	**Standard Error**	**Coefficient**	**Standard Error**
INTERCEPT	2.0386	1.3041	1.9758	1.304	2.0518	1.305
SEX	-0.0123	0.086	-0.0192	0.086	-0.0085	0.086
MOFIGED	0.0274	0.021	0.0272	0.021	0.0278	0.021
TEENMOM	-0.1028	0.110	-0.1020	0.110	-0.1042	0.110
INCOME	7.6E-6 ***	2.581E-6	7.63E-6 ***	2.582E-6	7.57E-6 ***	2.582E-6
BLACK	0.2643 *	0.136	0.2706 **	0.136	0.2633 *	0.136
NE	-0.3244 **	0.129	-0.3235 **	0.129	-0.3246 **	0.129
SOUTH	-0.1904 *	0.112	-0.1875 *	0.112	-0.1898 *	0.112
WEST	-0.2827 **	0.128	-0.2821 **	0.128	-0.2824 **	0.127
CITY	-0.2866 **	0.123	-0.2897 **	0.123	-0.2878 **	0.123
SUBURB	-0.2653 **	0.113	-0.2624 **	0.113	-0.2663 **	0.113
TWOPAR	-0.5960 ***	0.104	-0.5959 ***	0.104	-0.5949 ***	0.104
SIBS	-0.2473 ***	0.052	-0.2492 ***	0.052	-0.2472 ***	0.052
NHISPOV	-0.8259 ***	0.150	-0.8314 ***	0.150	-0.8249 ***	0.150
MONTHAGE	0.0807	0.048	-0.0790	0.048	-0.0815 *	0.048
AGESQ	0.0008	0.0004	0.0007	0.0004	0.0008 *	0.0004
HISPANIC	0.5620 ***	0.150	0.5679 ***	0.150	0.5639 ***	0.150
LOWBW	0.0542	0.165	----------	-----	----------	----------
CON1	----------	--------	0.1468	0.119	----------	----------
LIM	----------	--------	----------	-----	-0.1096	0.2092

*Significant at 10% **Significant at 5% ***Significant at 1%

Appendix Table A-2
Non-Health Logits - Full Results
Dependent Variable: CC1
1991 NHES
Children 3-5

	Effect of Low Birthweight		*Effect of Handicap*	
Variable	**Coefficient**	**Standard Error**	**Coefficient**	**Standard Error**
INTERCEPT	-3.1008 ***	0.819	-3.1042 ***	0.819
NE	-0.4033 ***	0.078	-0.4021 ***	0.078
WEST	-0.1216	0.076	-0.1208	0.076
SOUTH	0.0511	0.068	0.0520	0.068
HISPANIC	0.1039	0.083	0.1036	0.084
BLACK	0.2213 ***	0.082	0.2211 ***	0.082
INC	0.00001 ***	1.283E-6	0.00001 ***	1.283E-6
MONTHAGE	0.1335 ***	0.031	0.1337 ***	0.031
TWOPAR	-0.7838 ***	0.069	-0.7848 ***	0.070
SIBLING	-0.7250 ***	0.067	-0.7244 ***	0.068
MALE	0.1334 ***	0.051	0.1340 ***	0.051
TEENMOM	-0.1277 *	0.067	-0.1269 *	0.067
MOFIGED	0.0515 ***	0.010	0.0516 ***	0.010
URBAN	-0.2256 ***	0.066	-0.2263 ***	0.066
AGESQ	-0.0014 ***	0.0003	-0.0014 ***	0.0003
Low Birthweight	0.0196	0.108	----------	--------
Handicap	----------	--------	-0.0442	0.126

*Significant at 10% **Significant at 5% ***Significant at 1%

Appendix Table A-3
Non-Health Regressions - Full Results
Dependent Variable: CCHOURS1
1988 NHIS-CHS
Children 3-5

	Effect of Low Birthweight		*Effect of Chronic Condition*		*Effect of Activity Limitation*	
Variable	**Coefficient**	**Standard Error**	**Coefficient**	**Standard Error**	**Coefficient**	**Standard Error**
INTERCEPT	26.08 **	11.36	25.69 **	11.36	25.70 **	11.36
SEX	1.216	.7441	1.172	.7455	1.186	.7449
MOFIGED	-.0447	.1813	-.0467	.1813	-.0470	.1813
TEENMOM	-.6132	.9362	-.6107	.9360	-.6079	.9361
INCOME	.0000	.0000	.0000	.0000	.0000	.0000
BLACK	.5767	1.169	.6241	1.169	.5492	1.167
NE	-2.743 **	1.118	-2.730 **	1.117	-2.751 **	1.117
SOUTH	-2.446 **	.9791	-2.431 **	.9788	-2.439 **	.9788
WEST	-2.299 **	1.099	-2.292 **	1.099	-2.286 **	1.099
CITY	-2.657 **	1.059	-2.673 **	1.059	-2.647 **	1.059
SUBURB	-2.743 ***	.9804	-2.726 ***	.980	-2.726 ***	.9804
TWOPAR	-4.407 ***	.8976	-4.405 ***	.8972	-4.406 ***	.8972
SIBS	-1.900 ***	.4216	-1.906 ***	.4216	-1.900 ***	.4215
NHISPOV	-8.639 ***	1.212	-8.662 ***	1.211	-8.663 ***	1.212
MONTHAGE	-.0250	.4211	-.0137	.4211	-.0107	.4214
AGESQ	-.0006	.0039	-.0007	.0039	-.0008	.0039
HISPANIC	3.900 ***	1.300	3.933 ***	1.299	3.878 ***	1.300
LOWBW	-.2140	1.410	----------	----------	----------	----------
CON1	----------	----------	.9116	1.040	----------	----------
LIM	----------	----------	----------	----------	1.323	1.785

*Significant at 10% **Significant at 5% ***Significant at 1%

Appendix Table A-4
Non-Health Regressions - Full Results
Dependent Variable: QUALPK
1991 NHES
Children 3-5

	Effect of Low Birthweight		*Effect of Handicap*	
Variable	**Coefficient**	**Standard Error**	**Coefficient**	**Standard Error**
INTERCEPT	.4573 ***	.1093	.4320 ***	.1078
MALE	.0044	.0052	.0015	.0051
NE	.0037	.0075	.0033	.0074
WEST	-.0043	.0077	.0038	.0076
SOUTH	-.0078	.0069	-.0055	.0068
HISPANIC	-.0148	.0095	-.0139	.0094
BLACK	.0021	.0091	.0034	.0090
INC	-2.85 E-7 **	1.2 E-7	-2.69 E-7 **	1.2 E-7
MONTHAGE	-.0086 **	.0042	-.0076*	.0041
TWOPAR	.0054	.0077	.0091	.0076
SIBLING	-.0129 *	.0070	-.0147	.0068
TEENMOM	.0190 **	.0078	.0161 **	.0076
MOFIGED	.0001	.0011	-.0003	.0011
URBAN	-.0058	.0070	-.0035	.0069
AGESQ	.0006	.0000	.0001	.0000
Low Birthweight	.0413 ***	.0109	----------	----------
Handicap	----------	----------	.0922 ***	.0109

*Significant at 10% **Significant at 5% ***Significant at 1%

Appendix Table A-5
Health Logits - Full Results
Dependent Variable: HOSNITE
1988 NHIS-CHS
Children 3-5

	Effect of Low Birthweight		*Effect of Chronic Condition*		*Effect of Activity Limitation*	
Variable	**Coefficient**	**Standard Error**	**Coefficient**	**Standard Error**	**Coefficient**	**Standard Error**
INTERCEPT	-6.0252	4.715	-6.0135	4.843	-6.9221	4.827
SEX	0.8754 ***	0.312	0.7210 **	0.315	0.7762 **	0.314
MOFIGED	0.0039	0.070	-0.0066	0.072	-0.0092	0.069
TEENMOM	0.6386 *	0.342	0.7072 **	0.345	0.7051 **	0.345
INCOME	7.74E-6	8.564E-6	9.86E-6	8.68E-6	9.19E-6	8.666E-6
BLACK	-1.6373 **	0.757	-1.4273 *	0.755	-1.6928 **	0.762
NE	-0.1386	0.390	-0.1033	0.398	-0.1730	0.395
SOUTH	-0.4923	0.370	-0.4681	0.376	-0.4799	0.373
WEST	-0.0175 **	0.497	-1.0052 **	0.503	-0.9973 **	0.499
CITY	-0.8322 **	0.420	-0.8825 **	0.427	-0.7981 *	0.427
SUBURB	-0.6221 *	0.348	-0.5714	0.354	-0.5520	0.349
TWOPAR	-0.5695 *	0.328	-0.6411 *	0.330	-0.6095 *	0.332
SIBS	-0.3852 **	0.197	-0.3754 *	0.200	-0.4200 **	0.205
NHISPOV	-0.3036	0.513	-0.3180	0.519	-0.4405	0.526
MONTHAGE	0.0859	0.173	0.0813	0.176	0.1269	0.176
AGESQ	-0.0006	0.002	-0.0006	0.002	-0.0010	0.002
HISPANIC	0.4138	0.490	-0.5526	0.495	0.3886	0.495
LOWBW	0.8686 **	0.430	----------	-----	----------	----------
CONI	----------	--------	1.7385 ***	0.337	----------	----------
LIM	----------	--------	----------	-----	2.0713 ***	0.441

*Significant at 10% **Significant at 5% ***Significant at 1%

Appendix Table A-6
Health Regressions - Full Results
Dependent Variable: HOSPNTT
1988 NHIS-CHS
Children 3-5

	Effect of Low Birthweight		*Effect of Chronic Condition*		*Effect of Activity Limitation*	
Variable	**Coefficient**	**Standard Error**	**Coefficient**	**Standard Error**	**Coefficient**	**Standard Error**
INTERCEPT	-.3456	.9281	-.3671	.9277	-.3706	.9284
SEX	-.0082	.0609	-.0176	.0610	-.0132	.0609
MOFIGED	-.0032	.0148	-.0034	.0148	-.0036	.0148
TEENMOM	.0060	.0766	.0076	.0765	.0086	.0766
INCOME	.0000	.0000	.0000	.0000	.0000	.0000
BLACK	-.1294	.0950	-.1146	.0951	-.1296	.0949
NE	.1698 *	.0913	.1726 *	.0913	.1685 *	.0914
SOUTH	-.0255	.0803	-.0246	.0802	-.0263	.0802
WEST	-.0595	.0902	-.0587	.0901	-.0592	.0902
CITY	-.1725 **	.0869	-.1770 **	.0870	-.1722 **	.0869
SUBURB	-.1558 *	.0806	-.1548 *	.0805	-.1545 *	.0806
TWOPAR	-.0570	.0731	-.0598	.0731	-.0582	.0731
SIBS	-.0705 **	.0345	-.0697 **	.0344	-.0707 **	.0344
NHISPOV	.1587	.0992	.1583	.0991	.1561	.0993
MONTHAGE	.0217	.0345	.0223	.0345	.0229	.0345
AGESQ	-.0002	.0003	-.0002	.0003	-.0002	.0003
HISPANIC	-.0362	.1058	-.0311	.1058	-.0372	.1058
LOWBW	10746	.1161	----------	----------	----------	----------
CON1	----------	----------	.1893	.1176	----------	----------
LIM	----------	----------	----------	----------	.1869	.1781

*Significant at 10% **Significant at 5% ***Significant at 1%