The Dividends of a Great Start

Regional Economic Impacts of Conditions Affecting Children Birth to Five Years

In Six Michigan Counties
Antrim, Benzie, Grand Traverse, Kalkaska, Leelanau & Manistee

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Executive Summary

Northwest Lower Michigan, here defined as Antrim, Benzie, Grand Traverse, Kalkaska, Leelanau and Manistee, needs an economic boost. Most of the region is characterized by high unemployment, low median incomes, and poverty levels rising to the double digits. Ripples from a statewide economy in turmoil have made their way north as factories have closed, businesses have moved, and greater numbers of citizens have devolved from being economic producers to becoming economic consumers of federal, state, and local assistance programs.

The long term economic health of the region depends on attracting, retaining and creating businesses that will generate sustainable, high-quality jobs.

A staple concept of economic development states that a key factor in attracting and retaining business is having an educated workforce—the "employees of choice" who will meet the expectations of the new, knowledge-based economy. Supplemented by the natural resources and quality of life that northern Michigan offers, a highly educated workforce would be a natural draw to encourage businesses to locate in the region.

There is mounting evidence that one of the most cost-effective ways to produce well-educated, well-adjusted, innovative and healthy workers is to invest in them when they are children, birth to five years old, well before they are in the work force.

In studies fielded by governments, businesses, and academic institutions, it has been shown that investing in children birth to five years produces dramatic effects in school performance and subsequent work life.

Grounded in strong medical evidence, these studies show that more neural connections are formed in the developing brains of young children when they are provided with positive stimulation and freedom from environmental and emotional stressors. Under the right circumstances at this critical stage, young children can be set on the path that leads to a successful life of learning, work, and responsibility. Without these circumstances at this age, the window closes, leaving communities to suffer the costs of lost potential: higher needs, slower progress, and sometimes even deviant behavior.

Business leaders, elected officials, parents, educators, and other community members have the opportunity to ensure that young children, especially those in challenging socioeconomic circumstances, grow up with the best possible set of supports. By doing so, the region and its economy will benefit dramatically.

This study estimates that there are straightforward investments the region can make that will pay at least $6 for every dollar spent.

> *"I used to see this strictly as an education or social welfare issue. I now have come to understand early childhood programs in terms of the economic benefit we all gain in future years. Societal issues, law enforcement, the prosperity of the state and the region…these are all at stake."* - Derek Bailey, Chairman, Grand Traverse Band of Ottawa and Chippewa Indians

The following is a list of the most critical investments that need to be made along with conservative estimates of financial savings to the community:

1. **Early Care and Education** – Investing in quality early care and education programs for the children currently not enrolled will feasibly benefit the region by $24.7 million annually for an investment of $7.1 million. These children would arrive at kindergarten better prepared to learn and succeed throughout school. The economic benefit derives from:
    a. Reduced costs associated with assignment to special education programs
    b. Reduced costs associated with grade repetition
    c. Enhanced income potential associated with higher rates of high school graduation
    d. Associated reduced costs in law enforcement and incarceration related to higher rates of high school graduation

2. **Support for Parents** – Investing in supports for parents will feasibly save the region $3.8 million annually through reduced incidence of births to teen parents. In addition, employer policies which support parents in the workplace, such as access to quality child care, flex time to take children to appointments, sick/vacation time to care for children who are ill, etc. will feasibly produce the following benefits:
    a. Reduced costs associated with absenteeism
    b. Reduced costs associated with turnover and recruitment
    c. Improved productivity

3. **Pediatric & Family Health** – Investing in pediatric and family health will feasibly save the region $7.6 million annually, through a combination of smoking cessation programs for pregnant mothers, prenatal care, infant nutrition programs, immunizations, and access to regular pediatric health care providers. The economic benefit would arise from:
    a. Reduced incidence of low birthweight births
    b. Reduced number of avoidable conditions associated with poor prenatal care
    c. Reduced incidence of diseases which could be prevented through immunization
    d. Reduced costs associated with chronic disease and visits to the emergency room

4. **Social & Emotional Health** – Investing in social and emotional health will feasibly save the region $7.2 million annually, through a combination of home visitations and community interventions and treatment for maternal mental health. The economic benefit would come from:
    a. Reduced costs of caring for children birth to five years who are assigned to care out of the home for abuse and neglect.
    b. Improvements to adult earnings

There are already a number of positive investments being made today in children birth to five years old. Where possible, this report showcases the organizations and groups whose investments in early childhood are producing results worth emulating.

At the highest possible level, this analysis reveals that the region has the potential to realize tremendous economic return in the following areas:

1) Enhanced availability of quality preschool programs for children at risk because of lower economic status.
2) Improved access to prenatal care for pregnant women.
3) Greater availability of workplace support for working parents.
4) Retained and expanded use of home visitations and community interventions to address the social and emotional health of families.

If these initiatives are consistently and cooperatively implemented, the region will see higher levels of educational attainment, lower levels of crime, more efficient use of public resources and greater economic competitiveness for years to come.

Introduction

Study Intent

This study is concerned with how we as a community raise our young children.

We did not approach this study from the standpoint of morality or value systems. Instead, this study was conceived in light of the mounting evidence that investments in our youngest citizens will pay enormous returns in the long-term economic competitiveness of our region, which for these purposes is defined as the six Michigan counties of: Antrim, Benzie, Grand Traverse, Kalkaska, Leelanau, and Manistee.

At the highest level, this report explores the hypothesis that providing children birth to five years old with mental stimulation, good health and nutrition, social and emotional nurturing, and other key inputs when they are young are among the best ways to ensure that they will mature to become productive, contributing members of the community, better prepared to be the good employees, good neighbors, and good business and civic leaders of the future. The converse of this key hypothesis is that not providing these inputs to young children greatly increases the probability that they will be a drain on our regional economy as they grow older. To test this hypothesis, we have sought to measure the impacts of a set of potential investments in young children in terms of the economic effects – through costs avoided and/or incremental revenue gained – that these investments have been shown to produce.

This study is written for anyone who has the ability to influence or benefit from the investments we make in young children, including parents, educators, elected officials, and taxpayers.

Overview of the Regional Economy

Why is it so critical to the regional economy of these six counties to find solutions that enhance economic competitiveness? The answer lies in the significant short-term and long-term economic challenges the region faces. As Table 1 shows, regional unemployment rates for much of the area are in the double digits. The median income in five of six regional counties is below the statewide average. The region is characterized by significant seasonal unemployment and is significantly dependent on cyclical industries such as construction, tourism, and automotive manufacturing.

In the face of these challenges, the region needs to find solutions which will win new long-term employment opportunities. Any investments that would encourage employers (particularly those in the "knowledge economy") to establish or maintain businesses within these six counties should logically be a priority.

Table 1 – Regional Economic Indicators

	Population Est. (2008)	Median Income (2007)	Persons Below Federal Poverty Line (2007)	Unemployment June 2010
Michigan	10,003,422	$47,931	13.9%	13.2%
Antrim	24,109	$43,099	12.0%	14.4%
Benzie	17,396	$41,198	9.7%	13.7%
Grand Traverse	86,071	$47,747	8.8%	11.6%
Kalkaska	17,066	$39,739	14.0%	13.1%
Leelanau	21,783	$55,292	7.5%	9.4%
Manistee	24,640	$38,949	14.1%	12.7%

Source: United States Census Bureau http://quickfacts.census.gov/qfd/states/26.html; Unemployment rates: Michigan Labor Market Information: http://www.milmi.org/

In addition to winning and retaining jobs, a key priority of the region should be maximizing the effectiveness of public spending. As subsequent sections of this report show, making investments in young children will reduce the need for significant public expenditure later on. An ounce of prevention in the form of a healthy childhood saves considerably more than a pound of spending later on in terms of education, social services, public health, and law enforcement.

In sum, investments that win new, long-term employment opportunities and reduce public spending in the future should be priorities in regional economic development. The balance of this report determines the effectiveness of investments in children birth to five years old in accomplishing these goals.

> *"It's not a family issue; this truly is a regional issue … and the region that gets this wins."* – Mike Hill, Superintendent, Traverse Bay Area Intermediate School District

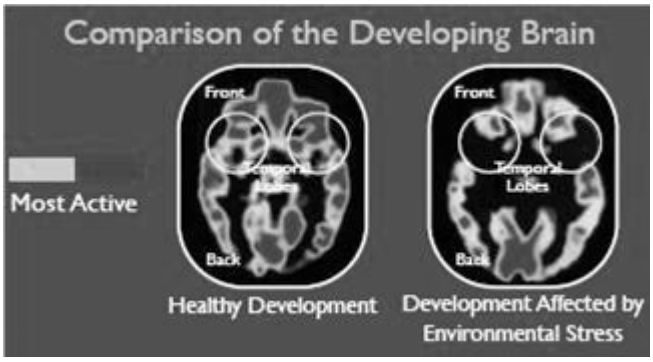
Early Childhood Development

The key premise upon which most of the findings of this report are based is that age birth to five is a critical period in a person's brain development. The development of the brain has a long trajectory, beginning within a few days after conception and continuing through adolescence and beyond (Shonkoff, 2002). Studies of learning and brain activity have shown that modifiable environmental factors in a child's early experience can greatly affect that child's learning trajectory (High, 2008). Positive stimulation leads to more brain activity and development. Neglect and environmental stressors such as abuse and poor nutrition reduce brain activity and inhibit brain development.

The following graphic shows side-by-side MRI images of brain activity. The first (left) image shows the brain of a child with healthy development. The second (right) image shows the brain of a child affected by environmental stress and lack of stimulation. The MRI image indicates that young children in stressful and/or non-stimulating environments do not experience the same level of brain activity as children in positive environments. Research has shown that children birth to five

years in these stressful and/or non-stimulating environments literally do not develop as many neural connections as children in healthy, supportive environments.[1]

Figure 1



If children grow up in an environment that promotes healthy brain development, they will have a foundation from which to build successful academic careers and lives. If not, these children may require years of remediation and yet never achieve their potential.

Subsequent sections of this report focus on the specific steps or investments that can be taken to produce positive gains in brain and social development for the individual and which, thereby, can produce measurable societal benefits.

> *"We need to figure out how to increase the number and quality of relationships in all children, from high risk to no risk. The first community and culture that acts on this gift to create consistent, nurturing, safe environments for young families and their children is going to see a huge quantum leap in all kinds of things and recapture 30% of dollars that could be used for the arts, infrastructure, and invention. One set of experiences will produce tax-payers and one set of experiences will produce tax-consumers."* – Bruce D. Perry, M.D. Ph.D[2]

> "*What happens between birth and five years old is critical in the development of a human being. The clock does not start at Kindergarten, it starts the minute a child is born (or before) and we need to be prepared to make the most of it.*" – Mary Jo Fifarek, Business Liaison, Great Start Traverse Bay/Manistee Collaborative

[1] Tierney, A., Nelson, C. III.(2009). Brain development and the role of experience in the early years. Zero to Three, 01 November 2009, vol./is. 30/2(9-13), 07368038.

[2] The Power of Early Childhood. Retrieved 9/23/10 from. www.slc.edu/media/cdi/pdf/Longfellow08_Perry_Policy.pdf Kansas Health Foundation 2005 Leadership Institute.

Study Methodology and Assumptions

This study is a meta-analysis of data and research collected from a variety of sources. We have applied landmark studies – cited either in peer-reviewed journal articles or in state and federal agency reporting – to local conditions in six counties of Northwest Lower Michigan.

We sought out studies that show how a particular investment in early childhood has produced a measurable change affecting the public good (e.g. "investment X produces outcome Y"). We then sought to apply an economic measurement to the change or potential change (e.g. "outcome Y saves Z dollars").

Throughout, we have made a good faith effort to balance findings showing inconsistent results. Where like studies have showed different measurable results, we have generally accepted the median result in conducting subsequent calculations of economic impact.

In applying these findings to the local situation, we acknowledge that these are not all "apples to apples" comparisons. Some important studies into investments in early childhood have been conducted in heavily urban areas that are perceptibly different from the rural counties of Northwest Lower Michigan. For this reason, wherever possible, we use local data in our analysis. Regardless, we believe all findings to be directionally valid and highly meaningful. The effects are real, as are the existing and potential benefits.

A list of references used is included on Page 42.

See Appendix A.1 for estimates of potential cost saving from reviewed studies.

Additional key assumptions used in this study are as follows

- All benefits are measured in terms of citizens/taxpayers. For example, if a child repeats a grade in a public school, the school receives the localized economic benefit of additional public funding. However, taxpayers are on the hook to pay that cost. We would measure this specific case (i.e. repeating a grade) as a net cost to taxpayers.

- We have not paid attention to the varied and changing nature of public funding. Using the example from the prior assumption, if a school is able to prevent a child repeating a grade, we recognize this as an economic savings to the region, although taxpayers may not necessarily see the full benefit of the avoided cost. By implication, if decision makers make investments that produce economic benefits within a public funding structure, they must also be mindful of recapturing the benefits produced.

- There are a host of important factors related to early childhood that fall under the general title of Family Support and Basic Needs. Essentially, there are many environmental effects that may be tied to poverty. Children living below the poverty line have certain challenges that are inherent in their economic status. In much of our analysis, we have had to assume that this is a given. Therefore, although it is true that a community which can raise a significant number of families and young children out of poverty will likely see significant economic benefits, we believed this was beyond the scope of our investigation.

- Finally, we believe that there are many worthwhile efforts/investments being undertaken on behalf of children which lie outside of this analysis. These include efforts by parents and caregivers as well as educators, case workers, public sector employees, etc. We have generally not highlighted these investment for one or more of the following reasons:
  - There are insufficient data to be able to measure the outcomes of the investment
  - There are insufficient data to measure the costs and/or benefits of the investment in financial terms
  - The investment cannot be seen in isolation, i.e. it is tied up in many other investments

Specific Areas of Impact

A great many specific investments that can be made in children birth to five years have been shown to produce measurable economic impacts over the long term. We have organized these topics into the following content areas: Early Care and Education; Support for Parents; Pediatric & Family Health; and Social & Emotional Health.

1. Early Care and Education (ECE)

Many early experiences can be educational for young children - going to a local museum, singing along with a parent, exploring the outdoors, attending preschool, etc. For the purposes of this analysis, these experiences are grouped together as "early care and education" (ECE). Providing young children with a set of positive ECE experiences before they begin kindergarten has been shown repeatedly to improve educational performance and to therefore lead to a lifetime of positive changes.

Evidence from a meta-analysis by Barnett (1995) establishes that ECE can produce large effects on IQ during the early childhood years and sizeable persistent effects on achievement, grade retention, special education, high school graduation, and socialization. The effects are large enough and persistent enough to make a meaningful difference in the lives of children.

> "*Decisions should be made with a clear acknowledgement in the forefront of everybody's thinking that getting it right at the preschool level is critical to what happens on the other end.*" – Gary Appel, Traverse City Area Public Schools Board of Education

Many of the data available regarding ECE relate to quality preschool (defined below). This is not to say that preschool is the only effective form of ECE or to imply that every child should necessarily attend preschool. However, evidence tells us that, particularly for children who are in challenging economic or family circumstances, quality center-based preschool can be a potent investment in ECE.

Overview of Quality Preschool and Existing Local Investments

Several landmark, long-term preschool studies including High/Scope Perry Preschool[3] (Perry Preschool), Chicago Child Parent Centers[4] (Chicago CPC), and the North Carolina Abecedarian Study[5] (Abecedarian) provide the foundation for subsequent analysis on the benefits of preschool. The specific outcomes discovered in these studies are detailed in subsequent sections on special education, grade repetition, high school graduation rates, etc.

In order to realize the benefits described in these studies, a preschool would need to deliver a comparable level of quality to the preschools in the studies. As described by Chase, Coffee-Borden, Anton, Moore & Valorose (2008), the preschool faculty would be well educated with lead teachers having at minimum a bachelor's degree (with early childhood certification), and assistant teachers having at least an associate's degree. The programs would be center-based with a comprehensive curriculum, covering areas ranging from socio-emotional development to pre-reading and mathematics skills.

As Table 2 shows, there were 4,785 children of preschool age (aged 3-4) in the six-county region in 2008. Since the majority of participants in the landmark studies cited above were lower income children, we assume that many of the most dramatic effects that could be realized by those studies would apply to lower income children within the six-county region. Using estimates of the percentages of school age children qualifying for free and reduced lunch, by county, we determine that there are 2,054 lower income children of preschool age in the region. Of the lower income preschool-aged children in the five counties for which data are available (excluding Manistee County), 43 percent were enrolled in two subsidized preschool programs (Head Start and Great Start Readiness Program) and an estimated 57 percent were not enrolled in preschool.

[3] High/Scope Perry Preschool began in 1962 in Ypsilanti, Michigan and was conducted over 4 decades by the late David P. Weikart, founder of the High/Scope Educational Research Foundation; Larry Schweinhart, High/Scope's current president; and their colleagues. Children in the study were randomly assigned either to receive the High/Scope Perry Preschool program or to receive no comparable program and were then tracked throughout their lives to age 40.

[4] Chicago - Child Parent Centers - a (1983-1985) inner city preschool program focused high-quality educational enrichment to at-risk children in group setting characterized by small class size, a focus on language and cognitive skills, and well-qualified and well-paid teachers (Temple & Reynolds, 2007).

[5] The Carolina Abecedarian Project was a controlled experiment that was conducted in 1972 in North Carolina, by the Frank Porter Graham Child Development Institute to study the potential benefits of early childhood education for poor children to enhance school readiness. The program started from infancy and continued for five years. The participants received high quality childcare, educational activities, as well as nutritional supplements, social services, and other types of health care.

Table 2 – Preschool Participation Among At-Risk Children

County	Preschool (3-4) Aged Children (2008)*	% of School Age Children Receiving Free and Reduced Lunch**	Estimated # of Lower Income Preschool Aged Children	Head Start[6] *** & GSRP[7] ****(2009/ 2010)	Estimated % of Lower Income Children in Preschool	Estimated # of At-Risk Children Currently Not In Preschool
Antrim	462	45.5	210	169	80.4%	41
Benzie	*436	55.1	240	74	30.8%	166
Grand Traverse	2,242	37.1	832	338	40.6%	494
Kalkaska	*427	60.9	260	80	30.8%	180
Leelanau	496	30.6	152	73	48.1%	79
Manistee	722	49.9	360	N/A		N/A
Region Total	**4,785**	**42.9**	**2,054**	**N/A**		**N/A**

*Source: * US Census Bureau Community Survey (2008); estimates for Kalkaska and Antrim County based on average % of total population of 2.5% from Antrim, Grand Traverse, Leelanau and Manistee ***NMCAA/Head Start, children enrolled at or below 130% of poverty level ****Michigan Department of Education*

We use these figures – 734 lower income children in quality preschool, 960 lower income children not enrolled in preschool – throughout our subsequent sections on the economic impacts of ECE.

For the purposes of calculating return on investment (ROI), we assume that the cost of providing quality preschool is $7,400 (the average cost between full day Head Start and full day GSRP rounded to the nearest hundred). Using this figure, we estimate that the region expends roughly $5.4 million today providing quality preschool to lower income children. Providing quality preschool to the 960 lower income children who currently do not receive it would cost the region an estimated $7.1 million. We return to the topic of return on investment at the end of this section on Early Care and Education.

Special Education

As Table 3 shows, in the six-county region an estimated 14.7 percent of all students are receiving special education services – nearly one out of every six children. Programs designed to deliver these services are resource-intensive. Most recent national estimates

[6] Head Start is one of the nation's oldest and most successful programs addressing the needs of children and families in poverty. Head Start and Early Head Start are comprehensive child development programs which serve children from birth to age five, pregnant women, and their families. They are child-focused programs and have the overall goal of increasing the school readiness of young children in low-income families (MDE).

[7] The Great Start Readiness Program (GSRP) offers preschool education to at-risk 4-year-olds. More than half of the children enrolled in the program must come from families with an income below 300 percent of the federal poverty level (FPL). Children who meet this income threshold must also have at least one of 24 other risk factors for educational disadvantage while children above the income threshold must have at least two of these risk factors to be eligible for GSRP.

indicate that students requiring special education services obtain 1.9 times as many resources as students in regular education programs. As Table 3 shows, special education students in Northwest Lower Michigan require between $10.8 thousand and $13.7 thousand (weighted average of $11,935) to educate annually. With the number of children receiving special education services increasing each year (High, 2008) so will the costs to communities/school districts. However, because school districts in the State of Michigan and therefore within this region operate on fixed operating budgets based on per capita reimbursement, as the need for special education services increases, there are quite literally fewer resources to go around for all other student services and program development.

Table 3 – Regional Special Education Enrollment and Spending

County	Total Enrollment (2009/2010)	Special Ed Enrollment 2009/2010	% of Total School Enrollment	Spending By Schools 2009/2010	Pro Rata Average Spending By TBAISD	Per Pupil Special Ed Spending
Antrim	3,535	487	13.8	$2,077,770	$3,330,414	$11,105
Benzie	2,263	439	19.4	$1,644,835	$3,002,160	$10,858
Grand Traverse	13,026	1,918	14.7	$10,312,045	$13,116,498	$12,215
Kalkaska	2,958	377	12.7	$1,802,095	$2,578,165	$11,619
Leelanau	2,405	327	13.6	$2,243,473	$2,236,233	$13,699
Manistee	3,181	N/A*	N/A*	N/A*	N/A*	N/A*
Weighted Average/Total of Antrim, Benzie, Grand Traverse, Kalkaska, Leelanau	24,187	3,548	14.7	$18,080,218	$24,263,470	$11,935

Source: Traverse Bay Area Intermediate School District
*No Data Available

Once a student has been assigned to a special education program, they are likely to remain in a special education "track" throughout their school career.

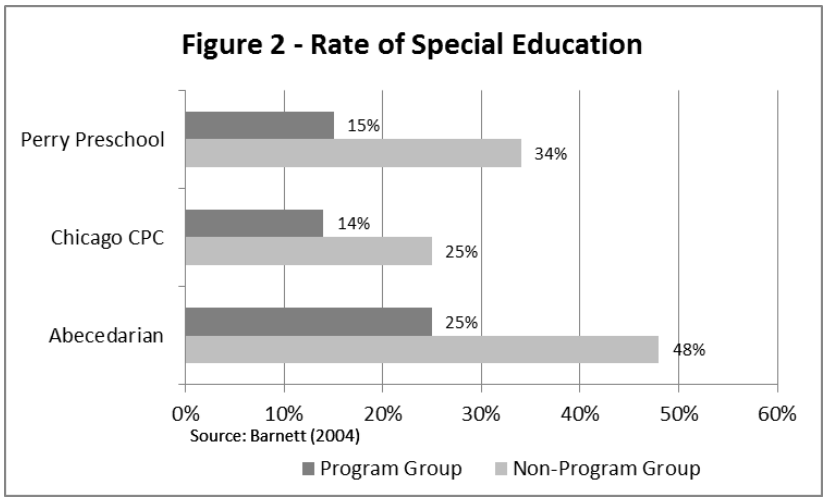
> *"More and more kids are coming to school unprepared and there are an increasing number of special ed referrals in our region. Once these kids get in the special ed system it is very challenging for them to get out."* – Mike Hill, Superintendent, Traverse Bay Area Intermediate School District

However, according to Chase (2009), 90% of students assigned to special ed are likely to have non-normative[8] disabilities which are preventable or shown to improve with early interventions.

[8] Non-normative disabilities include mild/moderate learning disabilities, mild mental retardation, mild hearing loss, and social/emotional/behavioral maladjustment (Chase, R., Anton, P., Diaz J., Martin Rogers N., & Rausch E. Wilder, 2009).

Participation in quality preschool programs is associated with significantly lower rates of special education assignment, largely because non-normative disabilities are moderated. A literature review performed by Anderson & St. Charles (2002) for the Task Force for Disease Control and Prevention found a 6 to 48 percent reduction in the incidence of special education assignment due to early childhood education.

The three landmark studies of ECE cited in the previous section all found significant reductions in special education assignment associated with participation in quality preschool. For the purposes of our analysis, we use the median of the three studies, Perry Preschool, which found a reduction from 34 percent of children assigned to 15 percent of children assigned.



Applying this Perry Preschool result to the region of Northwest Lower Michigan (in the five counties where data are available), we would estimate that if no lower income children at all were able to participate in center-based preschool, the regional rate of special education assignment would rise from 14.7% to 19.4% (see Appendix for calculations). On the other hand, if all lower income children could be enrolled in quality preschool programs, the rate of special education assignment would drop from 14.7% to 8.5%. This would equate to an additional 1,483 students avoiding special education assignment at any given point. These results are powerful.

Assuming that it costs a weighted average of $7,482 to educate one child in a regular education setting without special education services[9] and $11,935 to educate one child with special educations services (see Table 3 above), the region saves $4,453 per year for each child that is kept from being assigned for special education.

Based on these analyses, the region is already saving $5.0 million in special education spending by having lower income children enrolled in quality preschool. If quality preschool

[9] This represents a weighted average of Antrim ($7,608), Benzie ($7,768), Grand Traverse ($7,328), Kalkaska ($7,316), and Leelanau ($8,086). Enrollment data for Manistee County, with which to calculate a weighted average, was not available at the time of this writing. Source: Michigan Department of Education.

were extended to all lower income children, the economic impact would be an additional $6.6 million (for a total of $11.6 million).

We close this section with a quote from the director of a center-based quality preschool in Leelanau County. Although the evidence is anecdotal, it supports the powerful result found elsewhere in the country.

> *"We have gotten great feedback from special education teachers in our area on the children coming out of our program. They tell us they have had no new referrals from children coming from the Children's Center, this is powerful, a great success for our families and our community!"* – Maggie Sprattmoran, Director, Leelanau Children's Center

Total Potential Incremental Savings = $6.6 million

Grade Repetition

In the six-county region, an estimated 3.3% of students are repeating a grade in any given year. When students repeat a year to try to master the concepts they should have learned during the first attempt, taxpayers must pay for an extra year of funding to schools. As Table 4 shows, the region is spending approximately $6 million annually for students repeating grades.

Table 4 – Regional Cost of Grade Repetition

County	Total enrollment (2009/2010)	Number of Students K-12 Repeating Grades (2007/2008)	% of Students K-12 Repeating Grades (2007/2008)	Avg. Per Pupil Cost to Educate (2009/2010)	Total Current Cost
Antrim	3,535	144	4.1%	$7,608	$1,095,552
Benzie	2,263	63	2.8%	$7,768	$489,384
Grand Traverse	13,026	434	3.3%	$7,328	$3,180,352
Kalkaska	2,958	87	2.9%	$7,316	$636,492
Leelanau	2,405	75	3.1%	$8,086	$606,450
Manistee	3,181	N/A*	N/A*	$7,627	N/A*
Weighted Average/Total of Antrim, Benzie, Grand Traverse, Kalkaska, Leelanau	24,187	803	3.3%	$7,482	$6,008,230

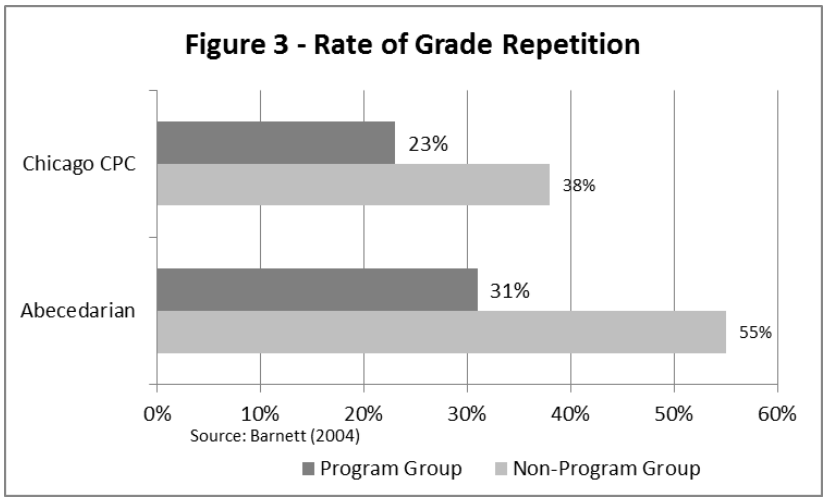
**No Data Available*

The annual cost to taxpayers represents only part of the total cost of grade repetition. Children who are retained one year are five times more likely to drop out of school than those who have never been retained (Aldridge & Goldman, 2007). With the effects of high

school graduation being so far-reaching and long-lasting (see next section), avoiding grade retention is especially important.

Children who enter kindergarten ready to learn are less likely to repeat any grade during their school careers than those who enter less prepared. Early care and education experiences such as quality preschool help children enter kindergarten ready to learn. In fact, quality preschool has been found to reduce the incidence of grade repetition on average by 21%.[10] (Anderson, Shinn, & St. Charles, 2002)

Two landmark studies found significant reductions in grade repetition associated with quality preschool for at-risk children. For the purposes of our analysis, we will use the more conservative of the two observed effects, Abecedarian, which found a significant reduction in grade retention rates among children who participated in quality preschool—from 55% retained to 31% retained.



Applying this Abecedarian result to the region of Northwest Lower Michigan, we would estimate that if no lower income children at all were able to participate in center-based preschool, the regional rate of grade repetition would rise from 3.3% to 4.1% (see Appendix for calculations). By contrast, if all lower income children could be enrolled in quality preschool programs, the rate of grade repetition would drop from 3.3% to 2.3%. This would equate to 187 students avoiding grade repetition.

Based on these analyses, the region is currently saving $1.4 million in grade repetition expenses by having lower income children enrolled in quality preschool. If we were able to extend the availability of these programs to all lower income children, the region's potential incremental savings would be $1.8 million.

Total Potential Incremental Savings = $1.8 million

[10] Retention in grade reduced by 21% (range of reported reductions were found to be 2% to 25%); in studies where means were reported, the effect size calculated is the difference in means between the intervention and the control group, divided by the standard deviation of the control group. Where the percentage point change was reported, the effect size calculated is the difference between the intervention and the control group.

High School Graduation

Regional dropout rates are lower than the statewide average. However, at least one in 25 students drops out of high school in each of the six counties of Northwest Lower Michigan considered in this study. In some counties, the rate is much higher.

Table 5 – Regional Graduation Rates

County	Number in Cohort	Drop Out Rate
Antrim	168	4.0%
Benzie	195	9.2%
Grand Traverse	1,131	6.1%
Kalkaska	208	8.0%
Leelanau	216	5.0%
Manistee	150	4.0%
Michigan		11.3%

Source: State of Michigan 2009 Cohort 4-Year Graduation and Dropout Rate Report

There are significant consequences to dropping out of high school and significant benefits to graduating from high school. This is true both at the individual level and at the regional economic level.

The individual income effects of high school graduation are shown in Table 6. These Michigan data reveal that those who graduate from high school are likely to have higher earnings and lower rates of poverty than those who do not.

Table 6 – Michigan Education Levels, Earnings and Poverty

Michigan	Population 18 to 24 years	Median earning in the past 12 months*	Poverty Rate 25yr > **
Less than high school graduate	15.8%	$18,800	24.9%
High school graduate (includes equivalency)	30.5%	$26,459	12.6%
Some college or associate's degree	45.7%	$32,659	9.0%
Bachelor's degree	8.0%	$48,101	4.0%
Graduate or professional degree		$65,654	3.0%

Source: U.S. Census Bureau, American Community Survey

**In 2008 inflation-adjusted dollars*

***Poverty rate for the population 25 years and over for whom poverty status is determined by educational attainment level.*

For the purposes of our analysis, we will use Heckman and Masterov's (2004) finding that high school graduates earn $10,372 more per year than non-graduates. [Figure 14c from Heckman & Masterov, 2004]

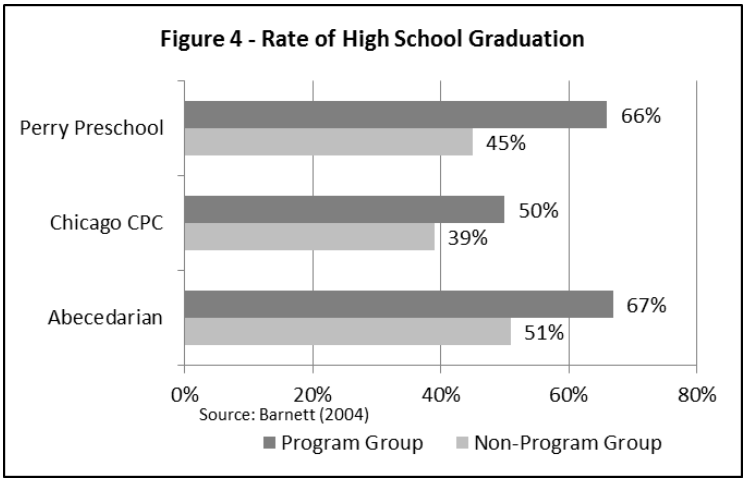
The regional effects of increasing high school graduation rates are widespread. For example, studies have found that high school graduates pay higher tax payments (Belfield, 2005), presumably reducing tax burdens and/or improving services for the balance of taxpayers. Some economists attempting to quantify the effects of educational attainment on economic growth have found that policies that increase high school graduation rates can affect economic growth through their effects on labor force productivity.

High school graduates also earn more and therefore create more economic activity than those who do not graduate.

Children who participate in quality preschool programs are significantly more likely to graduate from high school. In a review of 36 model and public programs by Barnett (1995) individuals who participated in preschool were, on average, 18% to 20% more likely to graduate from high school than non-participants.

> A study by Belfield, Nores, Barnett & Schweinhart (2005) found the following: *"One important benefit of the High/Scope Perry Preschool Program is that it enhances labor market opportunities—either directly via enhanced skills or indirectly through educational attainment. Labor market participation and earnings premiums convey benefits to the individual and to the general public.."*

As Figure 4 shows, each of the three landmark studies examined for this report showed a significant increase in high school graduation rates associated with participation in quality preschool. For the purposes of our analysis we use the median of the three studies (Abecedarian) which found an increase in graduation rates associated with participation in preschool - from 51% graduating from high school to 67% graduating.



Applying this Abecedarian result to the six-county region of Northwest Lower Michigan, we would estimate that if no lower income children at all were able to participate in center-based preschool, the regional dropout rate would rise from 6.1% to 7.2% (see Appendix for calculations). On the other hand, if all lower income children could be enrolled in quality preschool programs, the dropout rate would fall from 6.1% to 4.8%. This would equate to 27 additional students graduating from high school per year.

Over time, these graduation rates determine the character of the regional workforce.

Based on these analyses and assuming 40 years of full time employment, the region is currently accruing $8.7 million in additional economic activity associated with higher rates of high school graduation tied to preschool. If the region were able to extend quality preschool to all lower income children, the projected economic impact would be an additional $11.4 million.

Total Potential Incremental Savings = $11.4 million

Crime and ECE

Crime costs society a great deal. There are direct costs associated with law enforcement and corrections. For example, the Michigan Department of Corrections estimated that in 2009 it cost $34,025 per year to maintain an inmate in prison. The indirect costs associated with tangible losses to victims of violent crimes and property adds considerably to this dollar amount.

Regional rates of offenses and arrests are reported in Table 7.

Table 7 – Regional Offenses and Arrests - 2008

County	Total Adult Offenses (2008)	Total Adult Arrests (2008)	Total Juvenile (16 and Under) Arrests (2006)
Antrim	852	260	15
Benzie	1,025	316	15
Grand Traverse	9,290	4,753	371
Kalkaska	2,556	718	30
Leelanau	928	183	2
Manistee	2,901	1,391	128
Totals	17,552	7,621	561

Source: Michigan State Police

Education reduces crime. Completing high school is an effective crime prevention strategy. According to Heckman & Masterov (2004) poorly educated persons are much more likely to commit crimes than their better educated neighbors. Social scientists have long recognized this strong relationship between educational attainment and crime. Using longitudinal data, they have been able to relate participation in quality preschool programs to reductions in juvenile and adult crime (Temple & Reynolds, 2007). Children, especially

at-risk males, who participate in quality preschool have fewer behavioral issues and better academic success (i.e. higher rates of graduation), both of which have been shown to reduce the number and rate of criminal offenses and arrests.

Many economists and law enforcement professionals know that investing in high-quality early education will not only cut crime for a given region, but it can also save taxpayers hundreds of millions of dollars by reducing rates of prisoner incarceration by 25% or more[11].

When including all types of cost savings for crime reduction including costs of law enforcement and incarceration as well as personal property loss, a meta-analysis by Aos et al., (2004) of 58 early ECE programs found an average cost savings of nearly 69 cents for every dollar invested (as cited by Chase et al., 2009, p. 11) associated with reduced crime[12]. Applying this finding to the local situation, we would estimate that the region is currently saving $3.7 million in spending associated with crime from investments made in quality preschool. A further $4.9 million could be realized if preschool could be extended to all lower income children in the region.

Total Potential Incremental Savings = $4.9 million

Conclusions on Preschool

A number of other long-term effects of quality preschool have been identified and corroborated in a growing number of studies of preschool-program effects (Schweinhart, 2003). We mention these effects here, although we do not attempt to attach economic impacts from these effects at the local level.

- **Lower rates of teen pregnancy.** The rate of teen parenthood is much lower for individuals who have participated in quality preschool programs compared to those who have not (Campbell, Ramey, Pungello, Sparling, & Miller-Johnson, 2002). The costs and economic impacts associated with teen pregnancy are examined in the next section.

- **Lower rates of tobacco use.** Education tends to be correlated with lifestyle choices that are conducive to good health (Barnett & Masse, 2007). A follow-up on participants from the Abecedarian program showed that those with preschool (program group) were 16 percent less likely than the non-program group to use tobacco. There are significant personal and public savings associated with lower rates of tobacco use, especially in health care spending and insurance premiums.

[11] http://www.fightcrime.org/sites/default/files/reports/CT%20PreK-Prison.pdf

[12] Although it may seem that a 69 cent benefit for every dollar spent is a negative ROI, it is important to realize that each dollar spent impacts a variety of benefits. There would be a 69 cent ROI in the area of crime reduction, but there would also be quantitative benefits in areas like reduced grade repetition, reduced special education assignments, etc., for that single dollar. Overall ROI for investments in ECE is overwhelmingly positive.

These and other related effects are important to consider when looking at the benefits of preschool. However, because they are not easy to quantify financially, we look only at those effects to which we can ascribe a monetary savings, and we still see a significant benefit.

Summarizing the observed effects from the preceding sections we calculate the Return on Investment from existing and potential investments in quality preschool for lower income children in Table 8.

Table 8 – Summary Calculations of Return on Investment Related to Preschool

	Current	Potential/Incremental
Cost of Preschool	**$5.4M**	**$7.1M**
Benefits of Preschool		
Special Education	$5.0M	$6.6M
Grade Repetition	$1.4M	$1.8M
Graduation Rates	$8.7M	$11.4M
Law Enforcement	$3.7M	$4.9M
TOTAL	**$18.8M**	**$24.7M**
Net Return	**$13.4M**	**$17.6M**

As Table 8 shows, the region currently is realizing a net economic impact of $13.4 million from current investments in quality preschool. A further $17.6 million in net economic impact could be gained if the region extended quality preschool to the 960 lower income children who are not currently enrolled. This represents a return of $3.48 for every $1 invested, or an ROI of 248%.

This is a conservative estimate. The overall returns on investment determined in the Perry Preschool, Abecedarian, and Chicago CPC studies ranged from $3.79 to $9 for every $1 invested, in other words up to 800%.

"In Leelanau County we have really come together to define and adopt a system of early care and education that seems to work. I think the surrounding counties are capable of doing the same. The biggest hurdle we face is getting funding, we need the community to get behind us and make the necessary investments. Given the evidence, it's pretty clear that this is one investment that will ripple out to the community in so many ways and for many years to come." – Maggie Sprattmoran, Director, Leelanau Children's Center

Total Potential Benefits = $24.7 million
- Total Potential Costs = $7.1 million
Net Total Potential Return On Investment = $17.6 million

Other ECE Investments

Quality, center-based preschool for lower income students is just one example of an Early Care and Education investment with clear benefits for individuals and communities. The

key to this phase of life is stimulating brain activity in ways to produce more neural connections in areas of the brain affecting cognitive and language abilities. Thus, efforts to improve the quantity and quality of the stimulation that young children receive are likely to pay dividends comparable to those outlined in the preceding sections.

Such investments do not need to be the exclusive terrain of organized programs and fully equipped centers. For example, at a very basic level, parents playing and conversing with their children can help them cultivate more advanced linguistic skills and thereby facilitate cognitive development.[13] There is significant national evidence to show that reading with and to children at an early age can be a powerful means of ensuring their success.

> *"There are many children entering our school system who have not been in constructive early environments. Many of these children have rarely been read to by their parents. We need to communicate to parents the importance of reading to children and equip these parents to read both to and with their children so the kids come to school prepared and ready to learn."* – Steve Wade, Executive Director, United Way of Northwest Michigan

We close this section with a short passage illustrating the success of a regional program which relied on a cooperative effort between parents and educators. Kalkaska C.A.R.E.S. achieved measurable success in student achievement through supported reading and programming.

> **Kalkaska Cares:** Kalkaska C.A.R.E.S. (Children Acquiring Reading Essential Skills) (www.kalkaskacares.org) Early Reading First[14] (ERF) launched its program in November of 2006 in two rural communities in Northwest Michigan served by the Kalkaska Public Schools. ERF classrooms offered language and literacy activities based upon scientifically based reading research to improve the classroom environment, quality of instruction, and curriculum. This ensured that students entered kindergarten with the language, cognitive, and early reading skills necessary for continued success in school and life.
>
> The Kalkaska C.A.R.E.S./ERF was a program rich in resources and in language and literacy promoting strategies. It represented a comprehensive and complex response to the issues children living in poverty face in reading and school.[15] Characteristics of ERF classrooms included: language & literacy rich environments; comprehensive integrated curriculum; intentional instruction; fully trained teachers; multiple approaches to reading; thematic study; and ERF team support. A major component of the program was educating and engaging families. Throughout the year, Kalkaska C.A.R.E.S. families were supported through monthly family events, parent training, website and print materials, family meetings, and numerous opportunities to access free books and

[13] Zero to Three: National Center for Infants, Toddlers and Families (http://main.zerotothree.org/site/PageServer?pagename=ter_key_brainFAQ)

[14] Administered by the U.S. Department of Education, the Early Reading First (ERF) competitive grant program provides three years of funding to support local community efforts to create Preschool Centers of Excellence that enhance the oral language, cognitive, and early reading skills of children ages 3-5, especially those from low-income families.

[15] http://www.kalkaskacares.org/index.htm

resources to support children's learning at home. The program administrators also disseminated educational and literacy materials to ERF families and built alliances with other community agencies to address the school readiness needs of young children and to enhance home support.

Data collected over a two year period by Kalkaska's Early Reading First validate the impact of the program on children's school success in kindergarten. These data showed a 20% increase in kindergarten children's mastery of key literacy skills and a significant drop in the number of kindergarteners requiring intensive support and extra assistance. Additionally, findings indicate that the program achieved increased parent understanding and level of involvement in their children's learning. Parents reported that they were reading more with their children, practicing recognizing sight words and making lists together. One hundred percent of the parents reported reading to their children 3 to 4 times weekly and 45% read to their children every day.

This section has examined investments in early care and education from North Carolina to Chicago to Kalkaska, Michigan. Based on the data we have examined, it is clear that delivering a quality Early Care and Education can achieve real benefits in the subsequent lives of young children. These measurable, repeatable outcomes could bring tremendous social and economic rewards to the six counties examined in this study.

2. Support for Parents

There are many practical ways that families, businesses and communities can invest in young children by supporting parents. In this analysis we focus on two distinct areas where the potential economic effect is most apparent and easily attained.

Teen Parents

Teen mothers are more likely than other young women to drop out of school, remain unmarried, live in poverty and rely on public assistance (Terry-Humen, E., Manlove, J., & Moor, K., 2005). This has a lifetime of potential consequences for their children including poor school achievement, poverty, poor health, and social-emotional problems.

Many pregnant teens do not seek proper prenatal care. Inadequate prenatal care can lead to many complications for mother and baby including high blood pressure for the mother, pre term delivery, and low birthweight for babies to name a few (see Section 3 on Pediatric & Family Health for more information on the implications of inadequate prenatal care). In addition, babies born to teenagers are at a higher risk for abuse and neglect than those born to more mature mothers because young mothers are often uncertain about their roles and are more easily frustrated by the constant demands of caretaking, according to the American Academy of Child and Adolescent Psychiatry.

A study by Levine et al., (2001) showed that teen mothers spend less time providing enriching home activities, such as reading, to their children and that teen mothers tend to have more children than women who delay childbearing until they are older, causing them to devote less time to each child they have. Given the potential for this less enriching environment, children of teenage mothers also tend to have lower levels of school readiness (including lower math and reading scores, language and communication skills, social skills and physical and social well-being), compared to children born to women who are older (Terry-Humen et al., 2005).

The majority of economic costs of adolescent childbearing are borne by the taxpayers and by the rest of society, not by the teen mothers themselves (Maynard, R. A, 1997).

In a steady state with the annual number of first-time teenage mothers mirroring the current level of 336,783, the average annual cost to U.S. taxpayers of teen childbearing is an estimated $7.3 billion annually. This equates to $21,675 per teenage mother. (Hoffman, 2008)

Table 9 – Regional Costs of Teen Pregnancy

County	Births to Teens (20>) 3 year Average (2005-2007)	# of Births to teens (20>)	Estimated Annual Costs to Taxpayers
Antrim	11.5%	28	$606,919
Benzie	6.4%	13	$281,784
Grand Traverse	6.6%	65	$1,408,919
Kalkaska	14.0%	31	$671,946
Leelanau	5.4%	10	$216,756
Manistee	12.1%	28	$606,919
Total		175	$3,793,244

**Source: http://ww.milhs.org/our-work/kids-count/right-start-in-mi-2009#online*

Applying these numbers to the six-county region, we surmise that the region is spending $3.8 million annually in costs associated with births to teens.

There are numerous programs, steps and initiatives that effectively reduce teen pregnancies. Because of the diversity of costs for these programs, it is difficult to offer an accurate cost analysis; instead, we show the potential gains to be realized in this area and suggest that any new investments should be evaluated relative to their return against this figure.

Potential Savings = $3.8 million

Maternal Education

A wide body of literature on achievement has shown that parental education level is an important predictor of a child's future academic success. The foundation for a child's cognitive and non-cognitive abilities is shaped early on through the everyday interactions between that child and his or her parent(s). Educated parents are better equipped to provide this foundation by offering stimulating learning environments and quality, responsive interactions. Their children enter school ready to learn with a solid base of academic skills and tend to outperform other children (Entwisle & Alexander, 1993; Lee & Burkham, 2002).

A recent study conducted by the Michigan League for Human Services found that nearly 17% of all children in the State of Michigan are born to mothers with less than a high school education. Mothers with less than a high school education are typically much less likely to be prepared to take on the challenges of parenthood and to engage their children in learning related activities both inside and outside the home (e.g. reading books, music lessons, going to parks and museums, etc.) (Davis-Kean, 2005).

As Table 10 shows, significant numbers of regional babies are born to mothers without a high school diploma or GED.

Table 10 – Births to Women With No High School Diploma or GED

	% of Births to Women With No High School Diploma or GED
Antrim	15.2%
Benzie	5.7%
Grand Traverse	9.8%
Kalkaska	23.0%
Leelanau	7.6%
Manistee	19.5%
Michigan	16.5%

Sources: 2008 Kids Count – Michigan Data Book; Michigan Department of Community Health, Vital Records and Health Data Development Section.

These kids and their mothers are not "lost causes." Educating mothers helps kids. Research by Magnuson (2007) has shown that when mothers complete additional schooling their children perform better on subsequent academic skills test. The causes are both that more educated mothers tend to provide better home learning environments and these mothers tend to have higher expectations for their children's education (Alexander, Entwisle, & Bedinger, 1994; Corwyn & Bradley, 2003; Davis-Kean, 2005).

In a recent chapter of an edited volume on investments in children, Lisa Lynch argues:

> *"If we want to raise education levels in the United States, we need to consider investments in both youths and their parents, recognizing that parents are teachers too. Raising the skills and education of incumbent workers not only makes them more productive in the workplace but also contributes to the education of their children (Lynch (2000), 43-44)."*

Investing in maternal education makes sense for the region. Mothers and their children will achieve greater educational success and will ultimately be better workers.

Workplace Support for Parents

While issues of teen pregnancy affect a relatively narrow segment of the regional population, the challenges and issues facing working parents are widespread.

In the six-county region, 67% of children have all parents working outside the home (Great Futures). The need for child care is widespread.

Table 11 – Number of Children in the Region in Full-Time Care

County	Total Population Ages 0-5	% of children Under 6 with All Parents in the Labor Force	Estimated Number of Children in Child Care
Antrim	1,428	63.9	912
Benzie	1,138	70.3	800
Grand Traverse	5,784	67.0	3,875
Kalkaska	1,297	65.1	844
Leelanau	1,129	67.1	758
Manistee	1,503	69.5	1,045
Regional Total	12,279	67.1	8,234

Source: Census, 2006

Regional childcare providers acknowledge that throughout much of the region, available childcare is limited and of mixed quality. Interviews conducted with employers over the course of this study revealed that issues associated with access to child care have significant impacts on regional businesses and on their bottom lines. Nationwide, a lack of access to affordable, quality child care has been shown to make it difficult for businesses to hire and retain qualified employees. When employees take time off because of child care problems, or spend time at work focused on child care concerns, productivity and profits are reduced (U.S. Dept. of the Treasury, 1998). A study by Bond et al. (1998) found that more than one in four employed parents with children under the age of 13 had experienced a problem with their usual child care arrangement in the previous three months. In some cases employees may even need to leave their current jobs due to childcare problems, leading to increased hiring and training costs for employers, and economic consequences for the worker and local economy.

In the face of these problems, it may not be surprising that providing/having some access to child care is a factor in improving workers' productivity. A variety of studies suggest that available child care helps companies recruit and retain workers, improves workers' productivity, improves workplace morale, reduces absenteeism and tardiness and can actually save money for companies that provide assistance[16]. Some examples include the following:

- First Tennessee Bank reports reduced turnover costs of more than $1 million annually from work/family programs, including more flexible scheduling.

[16] *"The Economic and Labor Implications of Early Childhood Care and Education,"* from Early Childhood Care and Education: An Investment that Works (1997), published by the National Conference of State Legislatures

- Johnson & Johnson reports savings of more than $4 for every $1 invested in its work/family programs, including child care resource and referral information.
- Lancaster Laboratories has a turnover rate one-half the industry average, in part due to an on-site child care center.

"I am sort of surprised that there are not more businesses that offer onsite childcare. How can you as a business owner afford not to? There are so many benefits - heightened productivity, less callout/absenteeism, high employee engagement scores [according to Gallup polling]. A lot of business leaders just do not understand the importance of quality child care and how it impacts their bottom line." – Brigid Wilson, Munson Childcare

Not all businesses have the size or capacity to provide onsite child care. As an alternate investment, many employers nationwide have sought to make childcare available to employees by forming partnerships with child care resource and referral agencies (CCR&Rs) as a low-cost way to provide employees with a starting point for information on child care programs. CCR&Rs provide information to parents about child care, including information about local providers, the elements of high quality care, and advice on selecting a child care provider (U.S. Dept. of the Treasury, 1998). The Families and Work Institute Survey[17] finds that child care resource and referral is a very popular benefit for employers. More than half (55 percent) of the businesses surveyed offer access to information to help employees locate child care in their community.

Providing access to childcare is not the only step that regional employers can take in order to support their employees and gain the economic benefits described above. On a national level, it is estimated that making flex time available to employees to take care of sick children or otherwise fulfill parenting responsibilities could save $15 billion[18]. Beyond that, even a basic level of sensitivity to the needs of working parents can yield returns in terms of employee productivity and loyalty.

> *"As a small business owner for 15 years, I used to offer flex time not just to moms but to dads as well. I did this because I know that in a majority of families both parents are working and dads need the flex time too to take care of sick kids, attend school plays, etc."* – Becky Ewing, Rotary Charities

Given the large number of families in the region with all parents in the workforce, we believe that investments in workplace support of parents are among the most important that this region can make.

[17] http://www.familiesandwork.org/

[18] Nicholson et al. (2005) estimate that the annual cost of workforce absences due to illness was $74 billion. If workplace flexibility reduces absences by 20 percent and if all of this reduction translates into lower costs for employers, the implied savings due to flexibility are almost $15 billion a year.

3. Pediatric & Family Health

From a regional economic perspective there are two fundamental reasons why children's health is important: healthy brains develop inside healthy bodies; and early childhood health is a predictor of adult health.

First, physical health is an important precursor to the benefits already outlined in the section on Early Care and Education. Basic health needs must be met for learning to be maximized. Early health experiences guide brain development, influencing the creation and expansion of neural connections that provide the foundation for language, reasoning, problem solving, social skills, behavior and emotional health. (Shonkoff, J. & Philips, D., 2002; Thompson, R., 2001). Research by Essex, Boyce, Goldstein, Armstrong, Kraemer, & Kupfer (2002) shows that children's academic success and socio-emotional development are closely linked to both their physical and mental health. In a study of 4-8 year old children, there were strong inter-correlations between physical health, mental health (e.g. behavior problems), and academic functioning. Children who are healthy physically tend to succeed academically as well (National School Readiness Indicators Initiative).

Second and more directly, promoting the health of young children, at or before five years of age, can reduce substantial costs associated with avoidable health conditions in the future. Researchers from Johns Hopkins Bloomberg School of Public Health found several preventable early life health issues [1] in pre-school aged children that were precursors to long term health issues (Guyer, Ma, Grason, Frick, Perry, Sharkey & McIntosh, 2009). The total lifetime societal costs per child for these health issues is about $50,000. Given that about one-third to one-half of children born in the US are affected by these health problems, it is estimated that investments in young children in these areas could save the United States up to $65 billion in future healthcare costs.

> *"The healthcare piece is so crucial because it starts prenatally and it can define a future. People need to understand that inaction in some of these areas will have a huge impact on our region in 10-15 years. We need primary prevention that starts with prenatal care. I see this as having the greatest impact our economy."* – Lisa Peacock, Personal Health Administrator, Grand Traverse County Health Department

The impact for the six-county region is significant. A high proportion of children with avoidable health conditions are from lower income families. These children are more likely to be treated through uncompensated care programs of regional health providers. In order to cover these costs, health providers are likely to increase fees charged to other types of patients. Thus, citizens in the region have a vested interest in ensuring that these conditions are indeed avoided.

One of the most significant areas of cost, and therefore of potential economic benefit, is in the area of low birthweight.

Low Birthweight Infants

According to the National School Readiness Indicator Initiative report, infants born

weighing less than 2,500 grams (5.5 pounds) are at greater risk for physical and developmental problems than infants of normal weight. Children who are born at a low birthweight are at higher risk for long-term illness and/or disability. Today, a premature baby's chance of survival is much greater than in years past; the costs are also much greater.

The Office of Technology Assessment, an arm of the United States Congress, has found that caring for a baby weighing less than 5.5 pounds can cost $11,670 to $39,000 immediately after birth, and caring for a baby weighing less than 3.25 pounds can cost $62,000 to $150,000 immediately after birth (Cameron, 1993). This is often just the tip of the iceberg; some potential health issues and costs associated with low birthweight extend well beyond the period immediately after birth.

The March of Dimes estimates the average cost per low birthweight baby for the first year of life to be $49,000.[19] Using this figure, Table 12 shows that the six-county region is incurring $7.6 million dollars per year in these costs.

Table 12 – Regional Cost of Low Birthweight Births in First Year of Life

	# of Births	# Low Birthweight Births	% of Births That Are Low Birthweight	Cost to Region
Antrim	245	16	6.5%	$784,000
Benzie	205	14	6.8%	$686,000
Grand Traverse	982	69	7.0%	$3,381,000
Kalkaska	186	16	7.2%	$784,000
Leelanau	235	14	7.5%	$686,000
Manistee	235	27	11.5%	$1,323,000
Total	**2,074**	**156**	**7.5%**	**$7,644,000**

Source: 2006 DCH-CLICKS
March of Dimes average cost of low birthweight baby in first year of life is $49,000.

As will be documented in subsequent sections, the incidence of low birthweight can be significantly reduced through prenatal care, smoking cessation programs, and nutrition programs.

Potential Savings = $7.6 million

Prenatal Care

According to reports by the Annie E. Casey Foundation, Child Trends, and the Center for the Study of Social Policy, prenatal care presents a critical opportunity to identify and treat maternal health conditions that are likely to impact the health of a child at birth. Mothers who receive adequate prenatal care are less likely to have pre-term or low birthweight infants, less likely to smoke during pregnancy and more likely to obtain regular pediatric care for their young children after they are born.

[19] March of Dimes

As Table 13 shows, nearly one in five babies (17.7%) throughout the region is born to a mother who did not receive adequate prenatal care.

Table 13 – Prenatal Care

County	# of Births	# of Live Births to Women With Less Than Adequate Prenatal Care	% of Live Births to Women With Less Than Adequate Prenatal Care
Antrim	245	52	21.2
Benzie	205	34	16.4
Grand Traverse	982	150	15.3
Kalkaska	221	38	17.4
Leelanau	186	33	17.9
Manistee	235	59	25.0
Region	2074	366	17.7

*Source: *2006 DCH – Clicks; ** 2006 Clicks-Right Start)*

Many of the high costs associated with poor pregnancy outcomes are avoidable. For this reason, according to the American Congress of Obstetricians and Gynecologists, for every $1 spent on prenatal care, $3.33 is saved on post-delivery care and $4.63 on long-term care costs. This represents a critical opportunity to address a set of costly but solvable public health issues for the region.

Smoking During Pregnancy

When pregnant mothers smoke, there are numerous health impacts for the newborn. In addition to nearly doubling a woman's risk of having a low-birthweight baby[20] the nicotine, carbon monoxide and other chemicals in cigarettes can cause a number of health issues in infants and young children. In the United States, an estimated 776 infants died annually from causes attributed directly to maternal smoking during pregnancy.[21]

These issues have a cost and a regional economic impact. The CDC estimates smoking-attributable neonatal expenditures (SAEs) in Michigan to be $17,032,066 (in 1996 dollars)[22].

As Table 14 shows, regional rates of smoking during pregnancy are generally higher than the statewide average.

[20] From 7.2 percent for non-smokers to 11.9 percent for smokers. Martin, J.A., et al. Births: Final Data for 2004. National Vital Statistics Reports, volume 55, number 1, September 29, 2006.
[21] http://www.cdc.gov/reproductivehealth/data_stats/index.htm
[22] http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5339a2.htm

Table 14 – Regional Smoking During Pregnancy

County	# of Births by County	# of Live Births to Women Who Smoked During Pregnancy	% of Live Births to Women who Smoked During Pregnancy **
Antrim	245	51	20.8
Benzie	205	39	19.0
Grand Traverse	982	156	15.9
Kalkaska	221	59	26.7
Leelanau	186	21	11.3
Manistee	235	61	26.0
Regional Total	2,074	387	18.7
Michigan Average			12.8

*Source: *2006 DCH – Clicks; ** 2006 Clicks-Right Start)*

Smoking during pregnancy is preventable. According to the Center for Disease Control (CDC), smoking cessation counseling and programs offered during prenatal care provide effective assistance for pregnant women to quit smoking.[23]

Bernard Guyer et al. at Johns Hopkins Bloomberg School of Public Health found that smoking cessation programs for pregnant women can substantially reduce long-term, health-related costs for the children of smokers, with benefit-cost ratios as high as 12:1 through a combination of smoking cessation programs and health care provider communications.

Nutrition Programs

The number of low birthweight births can be reduced through nutrition programs. One such program is the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)[24].

Analysis has shown a strong correlation between participation in WIC and lower incidence of low birthweight births. Because of the savings in hospital costs incurred during the first year of life, the economic return in savings was estimated to be $3.07 per dollar invested (Avruch and Cackley, 1995). This finding was confirmed by the Michigan Department of Health, which found that every WIC dollar spent on a pregnant woman saves over $3.50 in federal, state, local and private health care costs.

[23] http://www.cdc.gov/mmwr/preview/mmwrhtml/ss5804a1.htm?s_cid=ss5804a1_e; http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5745a3.htm

[24] The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) is a federally-funded program that serves low and moderate income pregnant, breastfeeding, and postpartum women, infants, and children up to age 5 who have a nutrition-related health problem.

Additional WIC Benefits are as follows:[25]

- WIC participation significantly increases the number of women receiving adequate prenatal care.
- WIC participation dramatically lowers infant mortality among Medicaid beneficiaries.
- WIC improves the dietary intake of pregnant and postpartum women. It also improves weight gain in pregnant women.
- WIC participation decreases the incidence of low birthweight and lowers pre-term births.

Across the six counties of Northern Michigan studied in this report, WIC participation ranges between 42 and 59 percent.[26] This is far higher than the Michigan state average of 32.2 percent.

Although WIC is not the only means to sufficient nutrition for pregnant women, it is a program with proven success and proven economic return. The high levels of participation should be continued and increased.

Pediatric Medical Home

"In their day-to-day practices in medical homes, pediatric providers promote optimal nutrition, growth, and physical health as part of health maintenance, including provision of immunizations and anticipatory guidance. Their guidance regarding developmental and behavioral issues and concerns can help parents enhance their nurturing relationships with their children, prevent injury and abuse, screen for psychosocial risks such as family violence, maternal depression, substance abuse and lack of connection to community and family supports. They can counsel families with these kinds of needs and refer them to the appropriate resources within the community" (High, 2008).

Young children who have a regular healthcare provider (a medical home) are more likely to receive the quality and preventive care they need. In addition, they are more likely to receive screens for developmental, hearing and vision problems. Early detection and intervention in these problems can prevent subsequent problems such as more serious health issues, behavioral problems, academic challenges, etc.

68.6% of Michigan children birth to five years have a regular medical home,[27] which is higher than the national average is 57.5%. However, those living within or relatively close to federal poverty guidelines are less apt to have access to a regular healthcare provider.

[25] Source Michigan.gov/mdch

[26] Source: http://www.mdch.state.mi.us/PHA/OSR/chi/births/frame.html. In 2008, the following percentages were enrolled: Antrim (59.2%), Benzie (51.6%), Grand Traverse (44.1%), Kalkaska (74.0%), Leelanau (42.0%), Manistee (58.8%), Regional Total (51.3%).

- 400% of Federal Poverty Level (FPL) or higher – 73.3% have a medical home
- 200-399% of FPL – 70.1% have a medical home
- 100-199% of FPL – 53.1% have a medical home
- 0-99% of FPL – 43.5% have a medical home

Given the importance of having a medical home to many of the other key metrics and outcomes treated in this report, the region must pay attention to access to care for young children, especially those who are in lower income families.

Immunizations

Vaccines are cost-effective tools that prevent children from developing severe diseases. Late or missing immunizations can result in preventable illnesses that can lead to long-term physical and developmental problems (Center for the Study of Social Policy, 2002). An immunized population can be viewed as a public investment in a nation's or community's future, an investment that benefits society as a whole.

It makes economic sense for governments to provide immunizations for children. The cost-effectiveness of routine childhood immunizations has been well documented, with one estimate suggesting that for each dollar spent now on immunization, $10-$14 will be saved by preventing diseases in the future. (Center for Disease Control and Prevention – CDC). Additionally, for every $14-$20 USD spent on immunizations, a child gains one healthy year of life (Jamison et al., 2006).

A 2005 study by the U. S. Centers for Disease Control documented significant cost savings in both direct costs of disease and indirect costs related to loss of life and loss of productivity when children are not fully immunized. This study concluded that the direct cost of each child not immunized was $3,236 and the indirect cost was $12,242.[28] Table 15 shows that nearly 3,200 children within the region are without immunizations. Full immunization represents tens of millions in potential savings.

[27] Child and Adolescent Health Measurement Initiative 2007 National Survey of Children's health Medical Home State Profile Data. Resource Center for Child and Adolescent Health Website. Retrieved 8/30/2010 from www.medicalhomedata.org

[28] Fangjun, F. Santoli, J. Mesonnier, M. Yusuf, H. R. Sheffer, A., Chu, S. Rodewalkd, & L. Harpaz, R. Economic Evaluation of the 7 Vaccines Routine Immunization Schedule in the United States, 200; *Pediatric Adolescent Medicine*, Vol. 159. Dec. 2005.

Table 15 – Regional Immunization Rates

	# of Children Without Immunizations
Antrim	495
Benzie	204
Grand Traverse	1,337
Kalkaska	444
Leelanau	299
Manistee	414
Total	3,193

Source: 2009 Kids Count; data represents 2007 immunization rates

For a variety of reasons, not all parents want to have their children immunized. Therefore, the focus of the region should be to ensure that all parents who want immunizations for their children are able to obtain them, free from financial and logistic constraints (inconvenient office hours and locations, long waiting times, etc.). The economic returns would be significant.

Summary

As this section has shown, investments in pediatric and family health make good economic sense.

- Access to quality care for young children helps support emotional health and effective learning, which will ultimately help the region in its efforts to develop an attractive work force.
- Early prevention of health care risks can save a lifetime of healthcare spending for individuals. Since preventable health conditions are often disproportionately experienced by people from lower income households who must be treated by providers at reduced compensation rates, all community members often end up bearing the cost in the form of higher fees for service.

Many of the potential problems in pediatric and family health can be prevented with relatively simple and low-cost programs such as nutritional counseling and smoking cessation programs. By implementing more of these programs, the region will harvest tremendous economic returns.

4. Social & Emotional Health

When children grow up in safe, stable, and emotionally supportive environments, they are less likely to have significant social and emotional problems later in life and are more likely to be able to succeed academically and professionally.

Out of Home Care and Home Visitation

"Across families of diverse racial and socioeconomic backgrounds, it is clear that parents' emotional well-being, positive inter-parental relations, consistent parental support, sensitivity, and discipline all facilitate children's well-being, often to the point of compensating for economic hardship, family disruption, and other adverse life circumstances." (Demo & Cox, 2000) As the National Research Council states, "Children grow and thrive in the context of close and dependable relationships that provide love and nurturance, security, responsive interaction, and encouragement for exploration." By contrast, abusive or neglectful care and or dangerous/stressful emotional environments are manifest risks for healthy brain development and subsequent school readiness and academic achievement (Shonkoff, J., & Phillips, D., eds., 2002).

Some parents lack the experience and/or intuition to be able to provide the optimal social and emotional environments for their young children. In some cases, this extends to abuse and neglect to the point that children need to be removed from the home and placed in foster care or other out-of-home care. Table 16 shows the percentage of children 0-17 in out-of-home care for abuse and neglect within the six-county region.

Table 16 –Children (0-17) in Out of Home Care for Abuse &Neglect

	% of Children in Out of Home Care for Abuse and Neglect	Population (0-5)	Estimated Children (0-5) in Out of Home Care for Abuse and Neglect
Antrim	10.0%	1,486	149
Benzie	1.9%	1,207	23
Grand Traverse	3.7%	5,939	220
Kalkaska	13.4%	1,330	178
Leelanau	0.8%	1,149	9
Manistee	3.2%	1,496	48
			TOTAL = 627

Sources: 2008 Kids Count – Michigan Data Book; United States Census Community Survey 2007

Community interventions that involve in-home visitations and parenting training can improve parenting and, therefore, the early experiences of young children. This can have an impact both on children's ensuing need for public services and on their ability to succeed academically and professionally. Aos et al., (2004) found that some forms of home visiting programs that target high-risk and/or low-income mothers and children return between $6,000 and $17,200 per youth in reduced public expenditures. Estimates by researchers at Partners for America's Economic Success indicate that improvements in the early home

environment of young children can yield sizable benefits in adult earnings. Their middle-range estimates suggest benefits of between $7,976 and $33,899[29] per child.

Using the mean of $11,600 per child found by Aos et al. (2004) for the 627 children estimated to be in out-of-home care for abuse and neglect, we find that $7,268,096 in public expenditures could be prevented if the region were able to provide the support necessary to help birth parents keep their children.

Potential Savings = $7.2 million

Summary

Although there are many factors affecting the social and emotional well-being of young children in the region including parents, other relatives, educators, and religious communities, we have chosen to focus on the potential of home visitations and support for parents because a significant amount of potential harm can be corrected with relatively straightforward and inexpensive interventions.

[29] http://www.partnershipforsuccess.org/uploads/20090406_WiscColumExecSummary.pdf

Summary of Economic Impacts

The following table summarizes all significant economic impacts of investments in children birth to five years that have been identified in this report.

Area of Impact	Investment/Activity	Impacts/Effects	Economic Result (if available)
Early Care and Education	Extend quality preschool to lower income families	• Reduced assignment to special education • Reduced grade repetition • Increased graduation rates • Decreased crime • Lower rates of teen pregnancy • Lower rates of tobacco use	**$24.7 Million**
	Provide language and literacy enrichment (e.g. Kalkaska Cares)	• Greater success in kindergarten • Reduced demand for support services in elementary school • Stronger parental involvement	
Support for Parents	Reduce teen pregnancy	• Improved health care outcomes for children • Improved educational outcomes for children • Reduced public assistance	**$3.8 Million**
	Maternal education	• Improved educational outcomes for children	
	Support parents in the workplace	• Reduced employee absenteeism • Higher productivity • Reduced employee turnover	
Pediatric & Family Health	Provide prenatal care, smoking cessation, and nutrition programs to pregnant mothers	• Reduced incidence of low birthweight births • Lower child and lifetime medical costs	**$7.6 Million**
	Ensure access to a "medical home" for young children	• Early detection of medical issues • Reduced lifetime medical costs	
Social & Emotional Health	Provide home visitation and support to parents in at-risk households	• Reduced placement in out of home care • Reduced public expenditures	**$7.2 Million**

Conclusions – A Coordinated Action Plan

> *"The quality of life for a child and the contributions the child makes to society as an adult can be traced back to the first few years of life. The returns to early childhood development programs (ECDP's) are especially high when placed next to other spending by governments made in the name of economic development. Yet early childhood development (ECD) is rarely considered as an economic development measure."* (Rolnick & Grunewald, 2003)

This report has laid out in detail the areas in which making investments in early childhood can produce huge economic benefits for the communities of Northwest Lower Michigan. By working together to ensure that all young children, regardless of background or socioeconomic status, have access to mental stimulation, secure care environments, reasonable health care, and social and emotional stability, community members will see the fruits of lower public expenditures, lower crime rates, economic growth, and an improved standard of living.

To take advantage of these positive gains, the data show us the following roles and responsibilities:

Business Leaders
- Support economic development activities focused on young children
- Adopt parent-friendly employee policies, programs, and benefits
- Offer resources for quality child care programs

Community Members
- Support programs and initiatives geared toward early childhood
- Provide support and mentorship to young children and parents of young children in the community

Policy Makers
- Recognize the potential of investments early childhood to achieve dramatic savings in other areas of public expenditure
- Initiate and support measures designed to realize the benefits of early childhood

Parents
- Seek adequate prenatal care
- Do not smoke during pregnancy
- Ensure appropriate nutrition during pregnancy and childhood
- Provide variety and mental stimulation for children
- Provide secure social and emotional environments for children

Through understanding, cooperation, and active support, all of the many players in this community have an opportunity to build a better future around its youngest citizens.

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Appendix – Economic Impact Calculations

Economic impacts in this report are generally cited in one of three ways:

1. **Estimates of current costs or benefits of certain activities reported as total dollar costs.** For example, since Aos et al. (2004) found that some forms of home visiting programs that target high-risk and/or low-income mothers and children return between $6,000 and $17,200 per youth in reduced public expenditures, we calculate using the mean result and the total number of children within this region to determine the overall potential impact, as follows:

   $11,600 per child x 627 children in out of home care for neglect and abuse = $7.2 million

2. **Estimates of return on investment for expenditures in a particular area of investment.** For example, we report that the American Congress of Obstetricians and Gynecologists, for every $1 spent on prenatal care, $3.33 is saved on post-delivery care and $4.63 in long-term care costs. We generally report these findings "as is."

3. **Estimates of a potential reduction or increase in a base rate.** For example, the "median" landmark study into Special Education, the Perry Preschool study, showed that quality preschool for at risk populations could reduce special education assignment from 34% to 15%. The baseline rates in the study site vary from the baseline rates observed in the six-county area examined in this report. We therefore assume that the degree of the change can be observed in Northwest Michigan.

   $$\frac{\text{Perry Preschool Rate Without ECE} - \text{Rate With ECE}}{\text{Rate Without ECE}} =$$

   (34% - 15%)/34% = 55.9% Reduction in Special Ed Assignment with ECE

   The calculations above show that the Perry Preschool study produced a 55.9% reduction in the rate of special education assignment. Backing out a baseline rate given the current number of lower income children enrolled in quality preschools, we observe the following rates for the six counties of Northwest Lower Michigan.

   $$\frac{\text{Northern Lower Michiga Rate Without ECE} - \text{Rate With ECE}}{\text{Rate Without ECE}} =$$

   (19.4% - 8.5%)/19.4% = 55.9%

We believe each of these approaches to be valid and to be necessary for reporting economic impacts measured in different ways in the literature.

Ultimately, in order to measure an overall economic impact available to the region, we take data from diverse sources about potential returns on investment. The return on investment data that are available, current and complete are summarized in the following table.

Returns on Investment for Investments in Early Childhood

	Estimated Ranges of returns on investment (ROI)	**Programs/Studies**
Quality preschool for children of lower income families	2.5	Calculated within this report. See **Early Care and Education**
Workplace support for parents	3.0	Johnson & Johnson
Prenatal care	7.0	American Congress of Obstetricians and Gynecologists
Smoking cessation programs	11.0	Bernard Guyer et al
Nutrition programs	2.1	Avruch and Cackley, 1995
Immunizations	11.0	Center for Disease Control and Prevention
OVERALL MEAN	**6.1**	

Assuming that the region had $1 to spend on investments in early childhood and that this $1 were spent evenly among available investments, we estimate a return on investment of 600% across all of the categories examined.