



**Assessing the Known and Estimated Costs and Benefits
of Providing Mental Health Consultation Services to
Preschool-age Children in Early Education and Care Centers
In Massachusetts**

An Economic Evaluation of the Together For Kids (TFK) Project

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Executive Summary

The evidence from research and demonstration studies conducted across disciplines as varied as psychology, child development, neuroscience, and economics conclude that:

- (1) As many as one-third of all preschool-age children exhibit challenging behaviors yet few receive treatment.
- (2) While some preschoolers outgrow these behaviors, challenging behaviors often persist over time and lead to the need for costly education, mental health, and juvenile justice services throughout middle childhood, adolescence, and young adulthood.
- (3) Interventions for preschoolers with problem behaviors have been shown to be effective in reducing the extent of these problems.
- (4) Quality preschool programs for young children, especially, but not exclusively from low income families, including those with and without known behavior problems, have been shown to increase cognitive and school readiness skills as well as reduce the need for a wide range of services later on. Analyses of the costs and benefits together generally find a \$3 return for every \$1 invested.

Evidence from the Together for Kids (TFK) pilot demonstration project shows that:

- (1) In 2004, approximately 35% of children in four child care centers serving low to moderate income families in Worcester demonstrated clinical levels of behavior problems.
- (2) By assigning one half-time mental health consultant to each child care center, teachers received group and individualized training to deal more effectively with children with challenging behaviors and improve their classroom management skills. The mental health consultant also provided individualized treatment and other services to children with challenging behaviors and their parents.
- (3) The TFK model grew and matured over time as the mental health consultants developed positive relationships with parents, staff and administrators.
- (4) The consultation model, as implemented, was effective in reducing behavior problems in children receiving individualized treatment and in improving the overall classroom environment for all children.

Combining all the available data from previous studies and from the TFK demonstration project leads to the following conclusions.

- (1) For a direct cost to the state of \$1.13 per child per child care day (e.g., 261 typical work days per year), the TFK model can improve the quality of existing state-funded preschool programs. High quality preschool programs have been shown to return \$3 per every dollar invested.
- (2) Based on the projected reduction in the need for special education, investing one dollar in TFK can yield monetary benefits of approximately \$1.67 to \$2.23 one year later.
- (3) Developmental assessments of preschoolers in state-funded child care centers that implement the TFK model will identify preschoolers likely to have persistent behavior problems and provide treatment early; thereby reducing unmet need for services during

early childhood and future costs in special and remedial education, mental health, and juvenile justice.

Summary Report

I. Introduction

In response to the growing incidence of young children exhibiting challenging behaviors in preschool classrooms both locally and nationally, the Together for Kids (TFK) demonstration project began providing an integrated set of mental health services including individual consultation, teacher training, classroom assistance, and parenting skill development training to selected Worcester and South County child care centers in the fall of 2002. A comprehensive evaluation of the TFK model at these sites has found significant improvements in individual children's behavior and developmental skills as well as increases in the overall quality of the preschool classroom environment (Hennigan, Upshur, Wenz-Gross, 2003; Hennigan, Upshur, Wenz-Gross, 2004; see both reports at <http://www.hfcm.org/default.asp?=288>).

The purpose of this report is to utilize the findings from the TFK evaluation in combination with data from related research and demonstration studies to estimate the costs and benefits of a statewide implementation of the TFK model in state subsidized licensed preschool centers. Therefore, this report will present estimates of:

- (1) the average cost per child of implementing the TFK model; and
- (2) the average cost recouped per dollar invested due to savings from the reduced need for special education.

A technical report associated with this document provides a review of related research and additional details on the methods and assumptions used to produce the findings in this summary report.

II. A Cost Analysis of the TFK Model

The TFK project designed a consultation model of intervention that focused on 1) short-term individual child and family assistance for children with challenging behaviors; 2) classroom assistance for teachers; and 3) center-wide activities to enhance parent and teacher competencies in handling early childhood behavioral issues. Individuals with early childhood mental health experience were assigned to work as half-time consultants dedicated to a single child care center. The role of these mental health consultants (MHC) was varied and included working with the teachers to help identify children who needed extra assistance with behavioral issues. For these children and their families, the MHC conducted assessments and developed, with them, short-term intervention plans, assisted teachers with classroom strategies for these children, and referred the families for long-term services and other community services as needed. The MHC also provided center-wide training sessions for all staff on early childhood behavioral issues and assisted the centers in the design and delivery of center-wide parent activities to enhance parent involvement and provide information and support on parenting skills and other family issues. The fit between the style and skills of the MHC and each childcare center was critical to the success of the model.

Throughout the TFK demonstration, one MHC was assigned on a half-time basis to one child care center and thus served approximately 50 preschoolers and their families and teachers. In scaling up this model for statewide expansion, a ratio of one full-time MHC for every 200 children is being recommended. This recommendation is based on the collective experiences of the providers and evaluators who implemented the TFK model in the different sites over the past four years and their analysis of the evaluation data that both assessed the need for individualized services balanced against teacher and parent training needs, and calculated the average number of hours of service required to produce significant behavioral change. Scaling-up the TFK demonstration model to this “best practices” model for statewide implementation, however, involves giving each child care center time to integrate and fit these new services into their operation over a one to two year time frame.

Therefore, the primary direct cost associated with implementing the TFK best practices model in state-subsidized, center-based early education and care centers in Massachusetts is the package of salary, benefits, and supports provided to the MHC. The average cost of this package is presented below:

Average salary	42,000
Supervision	1,320
Fringe (20%)	8,864
Travel	1,000
Training	500
Subtotal	53,684
Administration (10%)	5,368
Total	59,052

The estimate of the average direct cost per child of implementing TFK statewide is based on the number of state subsidized licensed preschool slots in the Worcester County Region 2 (TFK Coalition estimates). In this region, 113 centers have a licensed capacity to serve 4,722 children between the ages of 3 and 4 years. At a rate of 200 children per one full-time MHC, serving 4,722 children would cost approximately \$1.4 million dollars.

On a per child basis, the best practices TFK model would cost an average of \$295 per child per year or \$1.13 per child per child care day (e.g., 261 typical work days per year). Thus, for a little over one dollar per child per child care day from the state, the TFK best practices model could be implemented across Massachusetts in state-subsidized licensed preschools.

III. Balancing the Costs and Benefits of TFK

The TFK intervention has produced significant improvements in individual children’s behavior and developmental skills as well as increases in the overall quality of the preschool classroom environment (Hennigan, Upshur, Wenz-Gross, 2003; Hennigan, Upshur, Wenz-Gross, 2004; see both reports at <http://www.hfcm.org/default.asp?=288>). Although these findings are important in understanding the effects on preschool children and the classrooms they attend, two additional questions must be asked: (1) What monetary benefits can be attributed to the TFK

demonstration? and, (2) How do these monetary benefits compare to the cost of implementing TFK?

To address these questions, morbidity-related costs must be assessed (Foster, Dodge, & Jones, 2003). Morbidity-related costs are the costs of related services. Related services are services related to the outcomes the intervention is trying to achieve. For example, TFK improved the developmental and behavior skills of children with challenging behaviors so it could be expected that they would have less of a need for special education services once they get to kindergarten. Reductions in the need for (and therefore cost of) related services represent a benefit of the intervention. A full cost analysis of the TFK demonstration should ultimately assess whether children who received TFK services needed less special education, remedial education, mental health, and juvenile justice services than children who did not participate in TFK. Research has shown that children with early behavior problems are likely to require significantly more of these types of costly services throughout childhood and into adolescence than children without early behavior problems (Foster, et al., 2005; Jones, et al., 2002).

To date, the TFK evaluation has been able to gather only a very limited amount of information on what happened to the children who received services under the TFK pilot demonstration project. A follow-up survey was only able to contact 13 of 31 TFK families (41.9%). Of the 13 families contacted, 7 were interviewed while 2 families refused and 4 never returned phone calls or completed the interview. A total of 5 children from these 7 families had made the transition to public school. The others were still in a child care center. Among the five in public school, however, none had a special education plan and none were receiving special services for behavioral issues (Wenz-Gross & Upshur, 2006). Thus, there is incomplete, though somewhat positive evidence from TFK that the developmental and behavioral gains and classroom improvement experienced as a result of the intervention is associated with a reduced need for special education in the public schools.

Given the limited data available from the TFK demonstration, estimates of the potential reduction in the need for special education were taken from other research studies in order to estimate a range of cost savings that may result from TFK (Belfield, 2004; The Conduct Problems Prevention Research Group, 2002). These data suggest that an estimated three to four preschoolers per center will be diverted from special education as a result of TFK. When the cost of implementing TFK is taken into account against the reduced need for special education, within one year, a savings of between \$1.67 and \$2.23 is generated per every dollar invested.

IV. Summary and Conclusions

The TFK demonstration project implemented a comprehensive model of mental health consultation, teacher training, and parenting skills development in selected Worcester and South County childcare centers in the fall of 2002. Over the first few years of the project, a best practices model evolved that was associated with positive changes in children's development and behavior skills and in the overall quality of the classroom environment. By combining the results from the TFK evaluation with those from other studies of related research, the following conclusions are supported:

1. To implement the TFK model statewide, a ratio of one full-time MHC to 200 children in state-supported licensed preschools is recommended.

2. At the recommended ratio, the average direct cost of TFK is estimated at \$295 per child per year or \$1.13 per child per child care day.
3. Based on the projected reduction in the need for special education, investing one dollar in TFK can yield monetary benefits of approximately \$1.67 to \$2.23, one year later.

Additional savings can be expected throughout the elementary, middle, and high school years from reductions in grade repetition, the use of mental health services, and interactions with the juvenile justice system.

Technical Report

I. Introduction

Public interest in early childhood mental health issues has grown over the last several years due to reports of increased expulsions from preschools of young children with challenging behaviors (Center for Mental Health Services, et al., 2000; Gilliam, 2005), an increase in the number of young children being referred to mental health professionals for severe aggression (Mark-Wilson, et al., 2002) and growing numbers of public school special education students with diagnoses of emotional impairment and behavior disorders in the early grades (Wenz-Gross & Upshur, 2006). In response to these trends, a growing number of states and localities have implemented mental health consultation programs to address the growing needs of young children in early care and education settings. Although some evaluations have linked this approach to positive changes in children's behavior, the strength of these findings is quite limited (Brennan, et al., 2005).

The Together for Kids (TFK) Coalition of childcare, health care, child welfare, and social service agencies in Worcester developed a consultation model of intervention based on these previous efforts. In addition, however, a strong evaluation design accompanied the implementation of the TFK model to test its impact on individual children and families as well as on the overall classroom environment. In the fall of 2002, the TFK consultation model was implemented in selected Worcester and South County child care centers. The TFK model focused on: 1) short-term individual child and family assistance for children with challenging behaviors; 2) classroom assistance for teachers; and 3) center-wide activities to enhance parent and teacher competencies in handling early childhood behavioral issues. Individuals with early childhood mental health experience were assigned to work as half-time consultants dedicated to a single childcare center.

The role of these mental health consultants (MHC) was varied and included working with the teachers to help identify children who needed extra assistance with behavioral issues. For identified children, the MHC conducted assessments and developed, with their parents, short-term intervention plans, assisted teachers with classroom strategies for these children, and referred the families for long-term services and other community services as needed. The MHC also provided center-wide training sessions for all staff on early childhood behavioral issues and assisted the centers in the design and delivery of center-wide parent activities to enhance parent involvement and provide information and support on parenting skills and other family issues. The fit between the style and skills of the MHC and each childcare center was critical to the success of the model.

The evaluation of the TFK model at these sites has found significant improvements in individual children's behavior and developmental skills as well as increases in the overall quality of the preschool classroom environment (Hennigan, Upshur, Wenz-Gross, 2003; Hennigan, Upshur, Wenz-Gross, 2004; see both reports at <http://www.hfcm.org/default.asp?=288>). No economic analysis of this model, however, has been conducted. Therefore, the goals of this technical report are to: (1) describe the prevalence and types of challenging behaviors among

preschool and school-age children and the medium and long-range costs associated with these behaviors; (2) investigate the types of interventions that have been implemented to address the problem and summarize their relative effectiveness; (3) conduct a cost analysis of the Together for Kids (TFK) best practices model; and (4) conduct an economic appraisal of the TFK model using data from the demonstration and published data from other studies to project reductions in future related service costs and make cost-benefit comparisons. A summary report accompanies this document and provides an overview of the key cost and benefit findings.

II. Prevalence and Cost

The precise prevalence of preschool children with challenging behaviors is difficult to pinpoint given its broad definition and the lack of a national database that tracks these behaviors. Challenging behaviors have been defined as “any repeated pattern of behavior, or perception of behavior that interferes with or is at risk of interfering with optimal learning or engagement in prosocial interactions with peers and adults” (Smith & Fox, 2003). In general, these behaviors include things like physical aggression such as biting, hitting, and throwing things, being defiant and noncompliant, destroying property, having severe tantrums, and being self-injurious as well as experiencing disrupted sleep and eating routines, being withdrawn, and having difficulty interacting with others.

Several studies have reported a range of rates of early childhood behavior problems. Campbell (1995) reviewed prevalence studies and found that between 10 and 15% of young children have mild to moderate behavior problems while a national study of the kindergarten class of 1998-1999 found that 10% of the children arrived at school with problematic behaviors (West, et al., 2000). Rates of psychiatric disorders among the preschool population have also been reported. Lavigne and colleagues (1996) found that 21% of preschool children met the criteria for a diagnosable disorder and of those, 9% were considered severe. Hawkins and colleagues (1999) reported that between 7 and 35% of young children meet the diagnostic criteria for oppositional defiant disorder (ODD) or conduct disorder (CD). Child screenings conducted as part of the TFK project resulted in a yield rate of 34.7% of children with clinically significant externalizing or internalizing behavior problems (Hennigan, Upshur, & Wenz-Gross, 2004).

The variation in these rates can be explained by factors related to biology, the environment, and human relationships as well as interactions between them (Shonkoff & Phillips, 2000; Zeanah, Stafford, Nagle, & Rice, 2005). Development depends in part on a child’s biological, genetic, and constitutional make-up. Differences in early childhood temperament are grounded in one’s biological make-up; some young children seem to be more vulnerable to disease or feeding and sleep difficulties while others show more resilience to these problems. It has become increasingly recognized that very young children can experience a variety of mental health disorders such as depression, anxiety disorders, and anti-social behaviors (Shonkoff & Phillips, 2000).

Characteristics of the environment that have been shown to have negative effects on early growth and development include poverty, exposure to maltreatment, homelessness, exposure to family or neighborhood violence, parental mental health problems, and prenatal substance abuse (Sameroff & Emde, 1989; Shonkoff & Phillips, 2000; Zeanah & Zeanah, 2001). For example,

rates of behavior problems have been found to be 2 to 3 times higher in low-income populations (Qi & Kaiser, 2003; Raver & Knitzer, 2002). Excessive stress has been found to actually disrupt how the brain is constructed (National Scientific Council on the Developing Child, 2005; Tiecher, et al., 2003). Exposure to stressful environments during early childhood when the brain is growing at a rapid rate (e.g., between birth and age 5, the brain triples in mass) activates stress-response systems that influence the way in which connections between neural circuits are made. These altered connections can increase the risk for various psychological disorders such as depression and post-traumatic stress disorder (Teicher, et al., 2002) as well as behavioral difficulties such as an inability to pay attention and lack of self-control (Gunnar, 1998).

Compounding the impact of poverty is the well-documented gap between the mental health needs of children and the supports and services that are available to meet those needs (President's New Freedom Commission on Mental Health, 2003; Tolan, et al., 2001; U.S. Public Health Service, 2000). This gap is larger for low income and minority groups (Huang, et al., 2005). Ringel and Sturm (2001) estimate that while mental health services meet the needs of only 31% of non-minority children, even fewer (13%) of minority children have access to mental health services.

The most critical factor in promoting healthy socio-emotional development, however, is having a secure attachment to a sensitive and responsive caregiver (Shonkoff & Phillips, 2000; National Scientific Council on the Developing Child, 2004a). Healthy physical and socio-emotional development depends on the quality and reliability of a young child's relationship to adults (in particular) and peers (as the child grows) both within and outside the family. For example, higher rates of behavior problems have been associated with certain parenting practices such as harsh and inconsistent discipline, poor monitoring, and low cognitive stimulation (Webster-Stratton & Taylor, 2001). Further, children spending long hours in child care settings may experience inconsistent attachment to caregivers due to high rates of staff turnover and overall low quality care (Cost Quality Outcome Study Team, 1995). This is troubling given that the majority of children under five years of age in the United States receive care on a regular basis from center-based programs or non-relatives (Capizzano & Adams, 2003). Yearly staff turnover rates have been estimated at 27% by the National Child Care Staffing Study (NCCSS) (Whitebrook, et al., 1998). The vast majority (80%) of the childcare programs observed in a different study, were of poor to mediocre quality. Poor ratings were associated with centers where no learning was encouraged and where no warmth or support from adults was observed (Cost Quality Outcome Study Team, 1995). This low quality care was also found to be most prevalent for children already at risk for poor outcomes such as low-income children (NICHD Early Child Care Research Network, 1997). Compounding this has been the impact of welfare reform regulations that require mothers to work longer hours, thus increasing the number of hours their children spend in day care (Brennan, et al., 2005).

A common misperception is that preschool children who exhibit challenging behaviors will "outgrow" them on their own. Dr. Jane Knitzer, Director of the National Center for Children and Poverty and Professor of Public Health at Columbia University disagrees. Dr. Knitzer has questioned: "If 25% of adolescents are at risk of not living, working, learning, and participating fully in their community, do you think it is a coincidence that the usual and customary figure we hear about young children not being ready to enter school and succeed is 25%?" (Knitzer, 2004). Preschool-age children with poor social skills are more likely to have greater difficulty with peer acceptance and developing mutual friendships (Powell, et al., 2006). Early peer rejection has

been associated with less positive feelings about school and persistent academic and social difficulties in elementary school (Ladd, et al., 1999). Although skilled preschool teachers know how to intervene when children have more typical difficulties with peers by helping them learn how to resolve conflicts and regulate their emotions (Casas, n.d.), teachers report that working with children who exhibit persistent and/or intensive behavioral and/or emotional problems is extremely difficult (Mark-Wilson, et al., 2002; Raver & Knitzer, 2002). Part of the frustration felt by teachers is due, in part, to the fact that these children don't meet their expectations of following directions, listening to instructions, controlling their temper, and getting along with others (Lane, et al., 2004). Teachers therefore make fewer attempts to engage aggressive and noncompliant children and withdraw their demands when the children misbehave (Carr, Taylor, & Robison, 1991). Therefore, children with more persistent behavior problems face an accumulation of difficulties often leading to a downward trajectory and reinforcement of negative behavior patterns over time (Boyd, et al., 2005). As the risks accumulate and increase across developmental periods, the likelihood that these children will continue to display anti-social behavior into adolescence also increases (Caspi & Bem, 1990).

Knowing which of the children who display early challenging behaviors, will continue on a pathway of increasing behavioral problems is critical since early behavioral problems are precursors for a variety of poor and costly outcomes later on in education (i.e., special education use, grade retention, dropping out of school), mental health (i.e., inpatient and outpatient services) and juvenile justice (i.e., crime, substance abuse, etc.) (Jones, et al., 2002). A variety of studies have tracked the extent to which early behavior problems persist. For toddlers and preschoolers with clinical levels of disruptive behaviors, 50% or more continue to display challenging behaviors four years later as well as into the school years (Campbell, 1995; Lavigne, et al., 1998; Shaw, et al., 2000). Richman et al. (1982) found that 62% of three-year olds with problems of impulsivity and oppositional behavior continued these problems through age 8. These children, called "early starters" (Moffitt, 1993; Patterson, et al. 1992), demonstrate that behavioral patterns can be remarkably stable (Farrington, et al., 1990). Although early starters represent only 6% of the general population, it has been estimated that they account for 50 to 60% of all known crimes (Blumstein, et al., 1986).

Data from the Fast Track Project (Conduct Problems Prevention Research Group, 1992; www.fasttrackproject.org) illustrate the impact of early behavioral problems on the later use of education, mental health, and juvenile justice services. The Fast Track program is a multicohort, multisite, longitudinal intervention designed to prevent serious conduct problems in high-risk children. The study was conducted in four communities (Durham, NC; Nashville, TN; rural central Pennsylvania; and Seattle, WA). In each site between 10 and 17 high risk schools were selected based on crime records, poverty statistics, and high school dropout rates. Half of the schools in each site were randomly assigned to the intervention group and half were assigned as control schools and did not receive any special services. In both the intervention and control schools, kindergarten children were identified as high risk using information collected from teachers and parents. At the intervention schools, the Fast Track program trained teachers to implement a curriculum in social and emotional development in their classrooms and provided parent groups, child social skill training, academic tutoring and home visiting to parents and children in the high-risk group.

The data reported in Tables 1 and 2 are based on the sample of high risk children in the Fast Track control group only as well as a representative, normative sample recruited from the

same control group schools. Thus, since none of the children in these analyses received the Fast Track intervention, the findings represent the impact of early behavioral problems on later educational, mental health, and juvenile justice service use and cost, among a representative sample of children living in poor neighborhoods across the United States.

Table 1 presents the rates of service utilization through the end of elementary school. Over one-third (36.3%) of all of the children in the sample needed special education services. Children in the high risk group, however, had a significantly higher rate of special education use (56.3%) than those in the non high risk group (33.2%). Slightly less than one-quarter of the overall sample repeated a grade and this did not differ significantly between the two groups. Specialized mental health services were needed by less than one-fifth (18%) of the overall sample but by almost one-half (46.5%) of the high risk group. In general, the rate of police contact was low (6.9%). A significantly greater percent of children in the high risk group (16.7%), however, already had police contact by the end of elementary school.

Table 1: Rates of Service Utilization Through the End of Elementary School

The Fast Track Project^a

Service	Population Estimate	High Risk	Non-high Risk	Marginal Effect ^b
Education				
IEP/special education services	36.3%	56.3%	33.2%	.205**
Repeated a grade	23.4	31.9	22.7	.076+
Mental Health				
Specialized mental health services ^c	18.1	46.5	13.0	.269**
Juvenile Justice				
Police contact	6.9	16.7	5.3	.035*

Note: ^a These data come from analyses of the Fast Track project data base and are published in Jones, et al., 2002.

^b The marginal effect represents the difference in the percentage of the high risk sample in each category as compared to the non-high risk sample, controlling for demographic characteristics.

^c Services provided for emotional, behavioral, drug, or alcohol problems.

+ p < .10; * p < .05; **p < .01

Table 2 provides an indication of how this level of service translates into high societal costs (Foster, et al., 2005). As in Table 1, the data in Table 2 also come from the Fast Track control group sample. The expenditures were calculated as the amount that a state or local government paid for the service or treatment. Three groups were compared. The conduct disorder group included children who met diagnostic criteria while the problem behaviors group did not meet diagnostic criteria but had elevated levels of problem behaviors. The no behavior

problems group consisted of children who neither met diagnostic criteria nor displayed elevated levels of problem behaviors.

Table 2: Average Per Child Expenditures at the End of Elementary School, Middle School, and High School by Group^a

The Fast Track Project^b

Expenditure ^c	Conduct Disorder	Problem Behaviors	No Behavior Problems
End of Elementary School			
School	\$2912	\$1921	\$1005
Mental Health			
Inpatient	1384	543	16
Outpatient	958	169	123
Juvenile Justice	17	21	4
Total^d	5271	2654	1148
End of Middle School			
School	4448	2664	1438
Mental Health			
Inpatient	1611	2350	137
Outpatient	1506	535	127
Juvenile Justice	1282	388	103
Total^d	8847	5937	1805
End of High School			
School	3732	2220	1381
Mental Health			
Inpatient	5833	4580	556
Outpatient	3269	823	199
Juvenile Justice	2446	366	323
Total^d	15,280	7989	2459

Note: ^a The groups were defined as follows at the end of elementary school. Children in the conduct disorder group met the diagnostic criteria for conduct disorder. Children in the behavior problems group never met diagnostic criteria for conduct disorder or oppositional defiant disorder but had elevated levels of problem behavior. The children in the no behavior problems group had no mental health diagnosis, nor elevated behavior problems.

^b These data come from analyses of the Fast Track project data base and are published in Foster, et al., 2005.

^c Each expenditure combines several service types. School expenditures combine costs for special education, grade retention and school counseling. Inpatient mental health expenditures combine costs for psychiatric hospital care, residential treatment center care, group home care, and foster care. Outpatient mental health expenditures combine costs for drug and alcohol clinics, day treatment centers, mental health center care, in-home providers, and individual counselor/therapist care. Juvenile justice expenditures combine costs for detention centers and arrests.

^d The totals were calculated by adding the average per child expenditures together. These were not presented in Foster, et al., 2005.

Two important findings are reflected in these data. First, the gap in expenditures between the conduct disorder group and the problem behaviors group suggests that conduct disorders do not need to be eliminated to achieve substantial cost savings. Even a reduction in the level of behavior problems (i.e., below clinical levels if not into the normal range) would result in substantially lower expenditures. Second, additional analyses of these data indicate that there is considerable within-group variability in terms of expenditures. In other words, within the conduct disorders group (and to some extent the problem behaviors group), the costs are concentrated among a small group of children and these costs rise over time as more service systems get involved. For example, at the end of elementary school, the costs are concentrated in the education system. At the end of middle school, however, increased costs are also seen in the mental health system. Finally, by the end of high school, costs spread to the juvenile justice system. Other research indicates that it is possible to identify this subgroup of children early on (Jones, et al., 2002; Weisz, et al., 2005). Thus, providing effective interventions to targeted groups of children early on could result in substantial savings.

III. Early Childhood Mental Health Interventions

The Together for Kids (TFK) Coalition of childcare, health care, child welfare, and social service agencies in Worcester developed a consultation model of intervention paired with a strong evaluation design to test its impact on individual children and families as well as on the overall classroom environment. In the fall of 2002, the TFK consultation model was implemented in selected Worcester and South County child care centers. The TFK model focused on: 1) short-term individual child and family assistance for children with challenging behaviors; 2) classroom assistance for teachers; and 3) center-wide activities to enhance parent and teacher competencies in handling early childhood behavioral issues. Individuals with early childhood mental health experience were assigned to work as half-time consultants dedicated to a single childcare center.

The role of these mental health consultants (MHC) was varied and included working with the teachers to help identify children who needed extra assistance with behavioral issues. For these children and their families, the MHC conducted assessments and developed, with them, short-term intervention plans, assisted teachers with classroom strategies for these children, and referred the families for long-term services and other community services as needed. The MHC also provided center-wide training sessions for all staff on early childhood behavioral issues and assisted the centers in the design and delivery of center-wide parent activities to enhance parent involvement and provide information and support on parenting skills and other family issues.

The evaluation of the TFK model at these sites has found significant improvements in individual children's behavior and developmental skills as well as increases in the overall quality of the preschool classroom environment (Hennigan, Upshur, Wenz-Gross, 2003; Hennigan, Upshur, Wenz-Gross, 2004; see both reports at <http://www.hfcm.org/default.asp?=288>). These more rigorous findings support the general conclusion of a review of other mental health consultation interventions which found that this approach is associated with positive changes in children's behavior, staff competencies, program outcomes, and families' skills in managing

difficult behaviors (Brennan, et al., 2005). The studies in the review by Brennan and colleagues, however, were characterized as having weak evaluation designs.

Many other research and demonstration projects have tested a variety of interventions focused on lowering behavior problems for children at-risk. A comprehensive review of these studies has found strong evidence that interventions can reduce behavior problems in children birth to eight years of age (Webster-Stratton & Taylor, 2001). Table 3 summarizes the findings from these studies. Decreases in peer aggression, arrests, delinquency, inappropriate behavior, classroom aggression with peers and teachers, and conduct problems at home have been found along with increases in problem solving and academic engagement. It is important to note that although in many studies the number of children with clinical levels of behavior problems was reduced, not all children experienced enough of a change to put them into the “normal” range. Further, many of these interventions were intensive interventions and thus the translation and application of these potentially valuable interventions has been limited (Glasgow, et al., 2003; Shoenwald & Hoagwood, 2001).

Table 3: Summary of Empirically Validated Prevention Programs for Young Children^a

Program Type and Name	Age of Children (Years)	Target and Format of Intervention	# of hours	Child Outcome
<u>Child-Focused</u>				
1. Incredible Years Dinosaur Program (Webster-Stratton, et al., 1997, 2000)	4-8	Small group child skills training	40 hours	↓ peer aggression
<u>Classroom-Focused</u>				
1. ICPS (Shure & Spivak, 1982)	4-5	Whole classroom social skills training	20 min daily lesson for 8 weeks	↑ problem solving
2. Perry Preschool (Schweinhart & Weikert, 1988)	3-4	Whole classroom academic skills training; child skills training; parent skills training and home visits	2.5 hours daily	↓ arrests ↓ delinquency
3. Contingencies for Learning Academic and Social Skills (CLASS) (Hops, et al., 1978)	4-6	Individual child training in the classroom	20 min daily for 1 month	↓ inappropriate behavior
4. Program for Academic Survival Skills			6 sessions +	

(PASS) (Greenwood, et al., 1977)	4-9	Teacher training and consultation	17 consultant visits	↓ inappropriate behavior
<i>Multifocused</i>				
1. First Step (CLASS; Walker, et al., 1998)	4-5	(a) Home-based parent skills training; (b) program consultants; (c) individual child training in class	(a) 6 wks, 1 hr/wk; (c) 2.5 hr daily for 3 months	↓ aggression ↑ academic engagement
2. Incredible Years Teacher Training (Webster-Stratton & Reid, 1999)	4-8	Group teacher training; group parent training; small group child training	36-50 hours for children, teachers and parents	↓ classroom aggression with peers and teachers ↓ conduct problems at home

Note: ^a These data come from a review published in Webster-Stratton & Taylor (2001).

Finally, over the past forty years, a series of well-known and well-tested interventions focused on providing quality early childhood programs, have produced many positive results primarily in terms of cognitive outcomes rather than behavior outcomes (see Table 4). Children participating in both model programs and government-supported early childhood programs in comparison to children not participating in these programs have demonstrated higher scores on achievement tests, greater language abilities, higher school readiness scores, higher levels of grade attainment, improved nutrition, better health, less frequent and less severe delinquent behavior, lower rates of drug use, and less criminal activity (Anderson, et al., 2003; Belfield, 2004; Currie, 2001). These outcomes have translated into positive budget effects over time in terms of less need for special education, less grade retention, lower dropout rates, higher high school graduation rates, more secondary education, more access to health care services, higher employment rates, higher earnings, lower welfare dependency, and less incarceration. Parents and families have also benefited from these higher quality early childhood programs in terms of having fewer additional children, better nutrition, improved parenting, less alcohol and drug abuse, and less criminal activity. As with the children, these parental benefits have translated into the completion of more years of education, higher rates of high school graduation, higher employment rates, higher earnings, and less welfare dependence.

Table 4: Measured Benefits, Budget Effects, and Overall Cost-Benefit Ratios of High Quality Early Childhood Development Programs¹

Benefits ^b	Budget Effects ^c	Overall Cost-Benefit Ratios ^d
<i>Child:</i> <ul style="list-style-type: none"> Higher scores on achievement tests Greater language abilities Higher school readiness Higher levels of 	<i>Child:</i> <ul style="list-style-type: none"> Less need for special education Less grade retention Lower dropout rates Higher high school graduation rates Pursue more secondary 	<i>Perry Preschool Program^e</i> <ul style="list-style-type: none"> Between \$2.45 and \$8.74 recouped per \$1 investment Followed study participants through age 27

<p>schooling attainment</p> <ul style="list-style-type: none"> • Improved nutrition • Better health • Less frequent and less severe delinquent behavior • Lower rates of drug use • Fewer criminal acts <p><u>Parents and families:</u></p> <ul style="list-style-type: none"> • Fewer additional births • Better nutrition • Improved parenting • Less drug and alcohol abuse • Fewer criminal acts 	<p>education</p> <ul style="list-style-type: none"> • More access to health care services • Higher employment rates • Higher earnings • Lower welfare dependency • Less incarceration <p><i>Parents and families:</i></p> <ul style="list-style-type: none"> • Complete more years of schooling • Higher high school graduation rates • More likely to be employed • Higher earnings • Less likely to use welfare 	<p><i>Abecedarian Early Childhood Intervention^f</i></p> <ul style="list-style-type: none"> • Between \$2 and \$3.66 recouped per \$1 investment • Followed study participants through age 21 <p><i>Chicago Child-Parent Pre School Center and Expansion Program^g</i></p> <ul style="list-style-type: none"> • \$7.14 was recouped for every \$1 investment • Followed study participants through age 21
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Note: ^a The items listed in this table were drawn from several empirical reviews of the findings from both randomized evaluations of model early childhood programs and large-scale public early childhood programs. There is general consensus around these findings. These reviews include Anderson, et al. (2003), Belfield (2004), Currie (2001), and Lynch (2004).

^b The benefits are measured outcomes that compare a group of children who participated in an early childhood program to a similar group of children who did not participate in an early childhood program. Different analyses measured outcomes at different time points.

^c Budget effects are considered to be those findings associated with rates of service use that result in either cost savings or greater expenditures depending on the outcome and time of measurement. For example, if children in early childhood programs end up needing less special education services, that is a cost savings to the school system. Later on, however, these children are less likely to dropout of school and thus continue to use public education dollars. Although this finding is associated with greater expenditures, it is generally considered a positive outcome.

^d The overall cost-benefit ratios represent the dollars that can be recouped in terms of benefits for every \$1 invested. Examples are given from three of the strongest studies conducted. The ranges vary in part because of the different number of years over which benefits are measured and the types of benefits included in each calculation.

^e Schweinhart, Barnes, & Weikert (1993).

^f Masse & Barnett (2002).

^g Reynolds, et al. (2001).

Economic analyses of several of the model and government-sponsored early childhood programs have indicated that investing in quality early childhood programs produces a high rate of return. Table 4 presents the cost-benefit ratios calculated for three selected programs. Overall, Belfield (2004) has found that quality preschool programs return approximately three dollars for every dollar invested. A recent analysis of all available economic studies of early childhood

interventions found that these programs could generate both short-term and longer-term benefits that can more than offset program costs. In addition, favorable benefit cost ratios were found for higher cost, more intensive programs as well as lower cost, less intensive programs (Karoly, Kilburn, & Cannon, 2005).

IV. An Initial Cost Analysis of TFK

As described previously, throughout the TFK demonstration, one MHC was assigned on a half-time basis to one childcare center and thus served approximately 50 preschoolers and their families and teachers (Hennigan, et al, 2003, 2004). The work of the MHC during the first year of the demonstration was focused more on developing working relationships with teachers and administrators and providing training for teachers and parents rather than providing individualized services to children identified as having clinically significant levels of behavior problems. During the second year, this began to shift a little so the MHC could provide more individualized services. During the first year of the demonstration, 16 children and their families received individualized services while 47 children and their families received targeted services in the second year. This increase in the provision of individualized services resulted in a concomitant decrease in offerings for teacher and parent training sessions. This shift is expected to continue into the third year and beyond.

In scaling up this model for statewide expansion, a ratio of one full-time MHC for every 200 children is being recommended. This recommendation is based on the collective experiences of the providers and evaluators who implemented this model in the different sites over the past four years and their analysis of the evaluation data that both assessed the need for individualized services balanced against teacher and parent training needs and calculated the average number of hours of service required to produce significant behavioral change. Scaling-up the TFK demonstration model to this “best practices” model for statewide implementation, however, assumes that the ratio will not be met in the first year or two. In order to cover 200 children, each MHC will need to serve more than one childcare center and thus time is needed to develop and embed the model in each center.

The cost analysis presented in this paper assumes that the ratio of 1 full-time MHC to 200 children has been reached. Therefore, the primary direct cost associated with implementing the TFK best practices model in state-subsidized, center-based early education and care centers in Massachusetts is the package of salary, benefits, and supports provided to the MHC. The average cost of this package for each MHC is presented below:

Average salary	42,000
Supervision	1,320
Fringe (20%)	8,864
Travel	1,000
Training	500
Subtotal	53,684
Administration (10%)	5,368
Total	59,052

The estimate of the average direct cost per child of implementing TFK statewide is based on the number of state subsidized licensed preschool slots in the Worcester County Region 2 (TFK Coalition estimates). In this region, 113 centers have a licensed capacity to serve 4,722 children between the ages of 3 and 4 years. At a rate of 200 children per one full-time MHC, serving 4,722 children would cost approximately \$1.4 million dollars.

On a per child basis, the best practices TFK model would cost an average of \$295 per child per year or \$1.13 per child per child care day (e.g., 261 typical work days per year). Thus, based on the recommended ratio, for a little over one dollar per child per child care day, the TFK best practices model could be implemented across Massachusetts in state-subsidized licensed preschools.

In order to conduct a full cost analysis from an economic perspective, however, a consideration of costs other than those that may be listed in an accounting system is needed. All the resources involved in delivering the intervention must be identified using the ingredients method (Levin & McEwan, 2001). Specification of the ingredients can be thought of as falling into two main categories; explicit and implicit. Explicit resources include such things as personnel, supplies, equipment, and training while implicit resources may be donated time and space.

The explicit or direct costs of the TFK best practices model have largely been accounted for in the package of salary, benefits, and supports provided to the MHC. Other costs such as supplies (e.g., office supplies such as paper, pens, etc., and any standardized tests that may need to be purchased) and equipment (e.g., any toys used specifically for interventions with individual children) could be accounted for. Since personnel salaries and benefits typically represent 75% or more of the cost of educational and social services interventions, and since no special supplies or equipment were purchased for the implementation of TFK, these costs are not estimated in this analysis (Levin & McEwan, 2001).

There are, however, important implicit costs in the TFK model to consider. The success of the model depends on the investment of time by parents, teachers, and administrators. From an economic perspective, this time represents an opportunity cost in that the time spent on TFK activities could be spent on other activities (Levin & McEwan, 2001). As Foster, Johnson-Shelton, and Taylor (2005) note, if the budget expenditures for two programs are essentially the same but one requires much more participant time than the other, participation may be lower and the dropout rate higher in the more time-intensive program.

The parents of TFK children targeted for individual intervention, for example, are asked to participate in an in-home assessment conducted by the MHC, help develop a plan for intervention, and, in some cases, receive individual services. Parents who participate in these activities are giving up the opportunity to spend that time at work, on household activities, or caring for other members of the family. Economists differ on how to value parent time (Gorsky, Haddix, & Shaffer, 1996; Hargreaves, et al., 1998). For this analysis, parent time was valued at zero since the evaluation revealed that the vast majority of parents (94%) disagreed or disagreed strongly that TFK services took too much time or expected too much from them (Hennigan, et al., 2004).

Teacher and administrator time was also valued at zero for this analysis because little data were available to determine when they were spending time on a TFK activity that could not be considered part of their job for which they were already being compensated. Future evaluations may conduct time studies to assess this more accurately in order to gain more insights into how this may play a role in the successful implementation of the TFK model in childcare sites.

V. Balancing the Costs and Benefits of TFK

The TFK intervention has produced significant improvements in individual children's behavior and developmental skills as well as increases in the overall quality of the preschool classroom environment (Hennigan, Upshur, Wenz-Gross, 2003; Hennigan, Upshur, Wenz-Gross, 2004; see both reports at <http://www.hfcm.org/default.asp?=-288>). Although these findings are important in understanding the effects on preschool children and the classrooms they attend, two additional questions must be asked: (1) What monetary benefits can be attributed to the TFK demonstration? and, (2) How do these monetary benefits compare to the cost of implementing TFK?

To address these questions, morbidity-related costs must be assessed (Foster, Dodge, & Jones, 2003). Morbidity-related costs are the costs of related services. Related services are services related to the outcomes you are trying to achieve. For example, TFK improved the developmental and behavior skills of children with challenging behaviors so it could be expected that they would have less of a need for special education services once they get to kindergarten. Reductions in the need for (and therefore cost of) related services represent a benefit of the intervention. A full cost analysis of the TFK demonstration should ultimately assess whether children who received TFK services needed less special education, remedial education, mental health, and juvenile justice services than children who did not participate in TFK. Research has shown that children with early behavior problems are likely to require significantly more of these types of costly services throughout childhood and into adolescence than children without early behavior problems (Foster, et al., 2005; Jones, et al., 2002).

To date, the TFK evaluation has been able to gather only a very limited amount of information on the school experiences of the children who received services under the TFK pilot demonstration project. A follow-up survey was only able to contact 13 of 31 TFK families (41.9%). Of the 13 families contacted, 7 were interviewed while 2 families refused and 4 never returned phone calls or completed the interview. A total of 5 children from these 7 families had made the transition to public school. The others were still in a child care center. Among the five in public school, however, none had a special education plan and none were receiving special services for behavioral issues (Wenz-Gross & Upshur, 2006). Thus, there is incomplete, though somewhat positive evidence from TFK that the developmental and behavioral gains and classroom improvement experienced as a result of the intervention is associated with a reduced need for special education in the public schools.

Given the limited data available from the TFK demonstration, estimates of the potential reduction in the need for special education were taken from other research studies in order to estimate a range of cost savings that may result from TFK (Belfield, 2004; The Conduct Problems Prevention Research Group, 2002). Appendix Table 1 presents a the steps taken to

calculate the projected cost offset in special education costs associated with TFK for an average-sized childcare center. Table 5 presents the results of this calculation.

Table 5: Cost Savings Per Dollar Associated with Reduced Need for Special Education^a

Calculations	High Risk	Non High Risk
<i>A. Calculate the number of TFK preschoolers likely to be diverted from special education per center</i>		
1. # of preschoolers in an average child care center ^b	15	27
2. % (#) of preschoolers expected to need special education without TFK ^c	56.3% (8)	33.2% (9)
3. % expected reduction in need for special education by TFK preschoolers	7% ^d	28% to 40% ^e
4. # of TFK preschoolers expected to be diverted from special education per center	.6	2.5 to 3.6
5. Total # of TFK preschoolers expected to be diverted from special education per center	3 to 4 TFK preschoolers	
<i>B. Estimate the cost savings associated with diverting TFK preschoolers from special education per center</i>		
1. Average per child per year cost difference between regular and special education in Massachusetts (2005 dollars) ^{f,g}	\$7263	
2. Projected cost savings associated with the expected number of TFK preschoolers diverted from special education per center	\$21,789 to \$29,052	
3. Discounted cost savings per center after one year^{h,i}	\$20,751 to \$27,669	
<i>C. Estimate the cost savings per dollar</i>		
1. Average cost of implementing TFK per center per year	\$12390	
2. Range of cost savings per dollar	\$1.67 to \$2.23	

Note: ^a See Appendix Table 1 for a complete explanation of the calculations and numbers presented in this table.

^b In Year 2 of the TFK demonstration, 35% of the preschool children across the sites were identified as having clinically significant externalizing or internalizing behavior problems (Together for Kids, Second Year Report, December 2004). The number of preschoolers in an average childcare center was estimated to be 42, since the state subsidized licensed preschool capacity in Worcester County Region 2 is 4,722 children across 113 centers.

^c See Table 1 and Jones, et al., 2002.

^d See The Conduct Problems Prevention Research Group, 2002.

^e See Belfield, 2004. The percent reductions calculated from analyses of large-scale public early childhood programs are used.

^f See http://finance1.doe.mass.edu/statistics/pp03_spedtext.html

^g Levin & McEwan (2001) recommend using the consumer price index to adjust costs for inflation.

^h See Currie, 2001.

ⁱ The savings from diverting TFK children from special education are discounted for one year since the savings will not be generated until they enter the public school system after leaving preschool. This may not be true for all children since preschools tend to serve children between the ages of 3 and 4 years.

The findings presented in Table 5 suggest that an estimated three to four preschoolers per center will be diverted from special education as a result of TFK. When the cost of implementing TFK is taken into account against the reduced need for special education, within one year, a savings of between \$1.67 and \$2.23 in special education dollars is generated per every dollar invested by the state.

VI. Summary and Conclusions

The TFK demonstration project implemented a comprehensive model of mental health consultation, teacher training, and parenting skills development in selected Worcester and South County child care centers in the fall of 2002. Over the first few years of the project, a best practices model evolved that was associated with positive changes in children's development and behavior skills and in the overall quality of the classroom environment. By combining the results from the TFK evaluation with those from other studies of related research, the following conclusions are supported:

1. To implement the TFK model statewide, a ratio of one full-time MHC to 200 children in state-supported licensed preschools is recommended.
2. At the recommended ratio, the average direct cost of TFK is estimated at \$295 per child per year or \$1.13 per child per child care day.
3. Based on the projected reduction in the need for special education, when the state invests one dollar in TFK, approximately \$1.67 to \$2.23 will be saved in special education costs one year later.
4. Additional savings can be expected throughout the elementary, middle, and high school years from reductions in grade repetition, the use of mental health services, and interactions with the juvenile justice system.

Continued research is needed to study how the TFK best practices model is scaled-up across the state in order to assess the reliability of the estimates produced by this report. In particular, three questions should be addressed. First, can the fit between the style and skills of the MHC and the childcare center (that was found to be crucial to the success of the model in the TFK demonstration project) be replicated when the ratio of MHC to child is increased to 1 to 200 and what impact will this have on the effectiveness of the model? Second, what investment of time is required by parents, teachers, and administrators in order to fully implement the TFK model? Finally, what type of special education and remedial education services are used by TFK graduates in kindergarten and the early elementary grades?

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Appendix Table 1

Calculation of Projected Cost Savings Per Dollar Associated with TFK per Average Center:

Savings in Special Education Costs

A. Calculate the number of TFK preschoolers likely to be diverted from special education per center

1. Calculate the number of preschoolers per average center likely to be identified as high risk versus non high risk:

(a) High Risk:

(% of clinically significant behavior problems^a) * (# of preschoolers in an average center)

$(.35) * (42) = 15$ high risk preschoolers per center

(b) Non High Risk:

(# of preschoolers in an average center) – (# of high risk preschoolers)

$(42) - (15) = 27$ non high risk preschoolers per center

2. Calculate the number of preschoolers expected to need special education if no intervention is provided by high risk versus non high risk:

(a) High Risk:

(% of high risk preschoolers likely to need special education services^b)
* (# of high risk preschoolers per center)

$(.563) * (15) = 8$ high risk preschoolers expected to need special education services per center

(b) Non High Risk:

(% of non high risk preschoolers likely to need special education services^b)
* (# of non high risk preschoolers per center)

$(.332) * (27) = 9$ non high risk preschoolers expected to need special education services per center

3. Published data on the expected percent reduction in the need for special education by preschoolers who have received services
 - (a) High Risk: 7% reduction^c
 - (b) Non High Risk: 28% to 40% reduction^d

4. Calculate the number of TFK preschoolers expected to be diverted from special education by high risk versus non high risk:
 - (a) High Risk:

(% reduction in need for special education) * (# high risk preschoolers likely to need special education per center)

$(.07) * (8) = .6$ high risk preschoolers expected to be diverted from special education due to TFK per center
 - (b) Non High Risk:

(% reduction in need for special education) * (# non high risk preschoolers likely to need special education per center)

$(.28) * (9) = 2.5$ non high risk preschoolers expected to be diverted from special education due to TFK per center

$(.40) * (9) = 3.6$ non high risk preschoolers expected to be diverted from special education due to TFK per center

5. Total number of preschoolers expected to be diverted from special education due to TFK per center

(# of high risk preschoolers expected to be diverted) + (# of non high risk preschoolers expected to be diverted)

$(.6) + (2.5) = 3.1$ TFK preschoolers expected to be diverted from special education due to TFK per center

$(.6) + (3.6) = 4.2$ TFK preschoolers expected to be diverted from special education due to TFK per center

Total Number of TFK Preschoolers Expected to be Diverted from Special Education:

3 to 4 TFK preschoolers

B. Estimate the cost savings associated with diverting TFK preschoolers from special education

1. Calculate the difference in the average cost per child of one year of special education and one year of education in Massachusetts^e and convert the difference to 2005 dollars^f, using the consumer price index inflation calculator (<http://data.bls.gov/cgi-bin/cpicalc.pl>):

(average per child cost of special education per year) – (average per child cost of education per year)

$$(\$13,542) - (\$6,779) = \$6,763 \text{ per year in 2003 dollars}$$

\$6,763 per year cost difference in 2003 dollars = \$7,263 per year cost difference in 2005 dollars

2. Projected cost savings of diverting children from special education as a result of TFK

(# preschoolers diverted from special education per center) * (per child per year cost difference)

$$(3) * (\$7,263) = \$21,789 \text{ per center per year}$$

$$(4) * (\$7,263) = \$29,052 \text{ per center per year}$$

3. Discount the cost savings for one year since the savings will not be generated until the preschoolers enter kindergarten. The cost savings per center are discounted at a rate of 5% per year^g

$$(\$21,789)/1.05 = \$20,751$$

$$(\$29,052)/1.05 = \$27,669$$

C. Estimate the cost savings per dollar

1. Calculate the average cost of implementing TFK per center per year

(average cost per child) * (# of preschoolers in an average center)

$$(\$295) * (42) = \$12,390$$

2. Calculate the range of cost savings per dollar

(Discounted cost savings per center) / (Average cost per center)

$$(\$20,751) / (\$12,390) = \$1.67$$

$$(\$27,669) / (\$12,390) = \$2.23$$

Notes:

^a In Year 2 of the TFK demonstration, 35% of the preschool children across the sites were identified as having clinically significant externalizing or internalizing behavior problems (Together for Kids, Second Year Report, December 2004). The number of preschoolers in an average childcare center was estimated to be 42, since the state subsidized licensed preschool capacity in Worcester County Region 2 is 4,722 children across 113 centers.

^b See Table 1 and Jones, et al., 2002.

^c See The Conduct Problems Prevention Research Group, 2002.

^d See Belfield, 2004. The percent reductions calculated from analyses of large-scale public early childhood programs are used.

^e See http://finance1.doe.mass.edu/statistics/pp03_spedtext.html

^f Levin & McEwan (2001) recommend using the consumer price index to adjust costs for inflation.

^g See Currie, 2001.